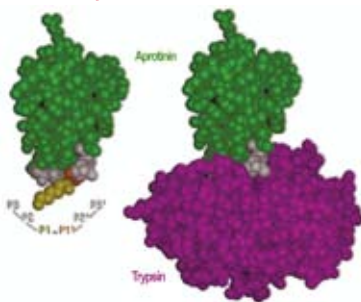


Introduction	26
Proteomics – Post-translational modifications Major modifications, related antibodies & enzymes	27
Phosphorylation : Kinases & Phosphatases	
Kinases in Cancer.....	28
Kinases in Neurodegenerative Diseases.....	31
Anti-kinases antibodies.....	33
Anti-phosphatases antibodies.....	39
Phosphospecific antibodies.....	40
Active Kinases et Phosphatases for enzyme assays.....	45
Ubiquitination & Sumoylation	
Ubiquitination.....	47
Sumoylation.....	49
Ubiquitination & Sumoylation related antibodies.....	51
Methylation & Acetylation	
Histone Deacetylases.....	53
Methylation, Acetylation and Histone modification related antibodies.....	54
Other modifications	
Related antibodies.....	56
References and sources of information	
Proteomics - Protein Expression	58
Protein Expression & Production	
Peptide synthesis.....	58
LEXSY protein expression system.....	59
Protein Expression & Reporting	
Firefly Luciferase 1-Step Assay Kit, 2 h reading.....	61
Reporter systems: GFP & lacZ (Renilla GFP vectors, β -Galactosidase Staining Kits).....	62
Protein Expression & Silencing (siRNA, miRNA)	
vector based microRNA technology (miRNA).....	63
miRNA Analysis with Agilent BioAnalyser.....	64
UptiFectin Transfection agent for Protein silencing (siRNA).....	65
Proteomics - Biochemistry of proteins	66
Protein preparation	
Protein Extraction Reagent.....	66
Uptitip™ Titanium.....	66
IPeX Ab-free Ag Immunoprecipitation Kit.....	67
Protein modifications	
FeBABE.....	68
other special modifiers/crosslinkers for 3D structure studies.....	68
ControlledAmine™ conjugation kit.....	69
Chromalink-Biotin.....	69
PEO/PEG Biochemistry : new reagents.....	70
Standard and improved fluorescent agents and kits.....	71
Protein analysis	
Glycoprotein or sugar fluorescent labeling and analysis.....	72
Colorimetric & fluorimetric Protein assays.....	73
BC Assay kit - colorimetric protein assay.....	74
LavaPep™ peptide & protein assay kit.....	75
Phosphate Assays.....	76
Innovative electrophoresis: NEXT gels.....	77
GeBa Electrophoresis system / pre-cast gels.....	78
ProSave™ Protein Gel stain.....	79
LavaPurple™ protein gel & blot stain.....	80
Blotting glycosylated proteins with Protran®.....	81
One-Step Western Blot Kit, ReliaBLOT™ IP/Western Blot.....	82
UptiLight™, the best of ECL detections.....	83
High quality Biochemicals.....	85
Trademarks and legals	86



Trypsin-aprotinin complex



Introduction

Interchim is pleased to present in this issue great tools for your research in functional proteomics, as well as some reagents for standard proteomics analysis. Applications include both fundamental and applied studies, such as medical diagnostic, protein production in biotech industries or drug discovery R&D.

As genomics did, proteomics studies moved from the exhaustive description (of proteins), including structure, profiling and localization, to their function, interactions and regulation. But the task is even more complicated for proteins than for genes. In fact, proteins have more complex, diverse and variable structures and functions.

Post-translational modifications and protein silencing represent some examples of key focus in the current researches.

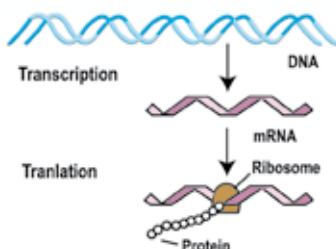
[a] In comparison, genes :

- have only 4 bases [ATGC nucleotides]
- fewer modifications
- less diverse structure
- less variability [SNPs, mutations: 1 per 50 millions] and interactions [typically with DNA, histones & growth factors].

DNA accounts for a small biomass weight. It contains ca 35000 genes, typically at one copy per cell (multiple identical copies for some genes)

Proteins are synthesized from gene sequence through complex processes, transcription (mRNA) and translation (pre-protein).

Schematic of protein synthesis
(1999, Addison Wesley Longman Inc.)



Technical tip – Protein characteristics, facts and proteome scale complexity

◆ Protein characteristics [versus Genes][a]

- structure base: 21 aminoacids
- over 10 types of modifications (phosphorylation, methylation, ubiquitination, sulfonation, glycosylation over...)
- complex to very complex structures (I to IV levels of conformation...)
- very large diversity and variability
- very diverse interactions (with various molecules, depending on environment conditions)

◆ Protein facts [versus Genes][a]

- 1/5th of biomass weight is proteins (~ 2x10⁹ proteins per cell)
- 200-3000 different proteins are represented in one cell, with a great variability depending on cell type and physiological state. Humans have about 3 times as many proteins as flies and worms.
- proteins are generated from ~ 35 000 genes in human (19098/13602/6034 genes in flies/worms/yeasts), with many variations (at gene, transcription, translation levels and during their lifespan)
- over 20 000 protein structures are deposited in public databases, that can be affiliated to ~ 1500 different representatives.

◆ Proteome scale complexity

- The number of possible proteins is virtually unlimited, primarily depending on aa sequence and length. Effective **diversity** in cells, resulting from genetic diversity, remains large and **is decoupled by modifications, polymorphism and interactions**. Furthermore, different cells types, at various states in diverse conditions, produce variable sets of proteins.
- Many proteins are **polymorphic**, resulting from different forms (alleles) of a same gene amongst individus of one geographic or ethnic population (genetic polymorphism, often at a single nucleotide site (SNP) which accounts for 0.1% variability in genome).
- Different proteins can be produced by a same gene using the processes of mRNA splicing (**pre-translational modifications**). This produces protein maturation within an organism (i.e. in antibodies and HLA molecules).
- Proteins variability is increased in cells by many **post-translational modifications**, that change their physical properties (i.e. the pI of different «isoforms») and biological activity (i.e. (in)activation of enzyme activity, binding affinity of receptors, ...).
This includes :
 - 1/ cleavage of a terminal sequence (ex: pro-thrombin),
 - 2/ group addition/removal (ex: RNA polymerase II phosphorylation / bind mRNA-capping enzyme)
 - 3/ complexation with other proteins, as well as metals, lipids, glycones, nucleic acids...
- Proteins (complexes) **interact** constantly **with their environment**, surrounding molecules (proteins, nucleic acids, lipids, metals...), more or less reversibly and specifically. These multiple interactions modify their 3D-structure and biological activity. (ex : (tetrameric) hemoglobin oxidation state, 3D conformation...).



Post-translational modifications

Major modifications, related antibodies & enzymes

This section presents a large selection of probes to detect specifically post-translational modifications, i.e. antibodies, bioactive peptides and proteins, as well as some active enzymes and assays. See the next sections for protein expression systems and for more protein analysis tools useful for your works in functional proteomics.

Cat.#	Description	Qty
U49040	Posttranslational Modifications of Proteins <i>Christoph Kannicht (Ed.), Methods in Molecular Biology Series, Vol. 194, Published by Humana Press, 2002. 322 pages; hardcover</i>	1 book

This book presents concisely several reproducible methods for detecting and analyzing a broad range of post-translational modifications, with detailed step-by-step protocols. The text highlights also modifications related to protein function, proteome research and the characterization of pharmaceutical proteins.

Phosphorylation : Kinases & Phosphatases

Phosphorylation of proteins is one of the most significant signal transduction mechanisms by which regulation occurs for crucial processes such as ion transport, cellular proliferation, and hormone responses. For discovery of reversible protein phosphorylation as a biological regulatory mechanism, Edmond H. Fischer and Edwin G. Krebs were awarded the 1992 Nobel Prize for Physiology and Medicine.

There are more than 500 members of the major classes of protein serine/threonine, tyrosine, and dual specificity kinases encoded by the human genome. Rapid and cascading phosphorylation of target proteins permits dynamic control of cell signaling and subsequent adaptation of cellular physiology in response to changes in environmental and cellular stimuli. Consistent with the complex role of the posttranslational modification in the cell, protein kinases can be regulated by other activator proteins, inhibitor proteins, ligand binding, regulatory subunits, cofactors, and phosphorylation by other proteins or by themselves (autophosphorylation).

To grasp the impact of protein kinases within the cell, consider that approximately one-third of mammalian proteins contain covalently bound phosphate. Disruption of protein kinase function or regulation is implicated in a host of major diseases, such as cancer, diabetes, and rheumatoid arthritis. Defects in genes that encode protein kinases underlie a number of inherited and acquired disorders, including leukemias, lymphomas, and autoimmune diseases.

Protein kinases represent as much as thirty percent of all protein targets under investigation by pharmaceutical companies. Even with the enormous amount of research and clinical success with the likes of inhibitors for protein kinase mTOR (for immunosuppression in organ transplantation), Abelson tyrosine kinase and the c-Kit receptor tyrosine kinase (chronic myelogenous leukemia and gastrointestinal stromal tumors) and the EGF receptor tyrosine kinase (non-small cell lung cancer), the overwhelming majority of kinases remain uncharacterized opportunities for scientific and biomedical advancement.

Technical tip - Modifications significance

Proteins often undergo posttranslational modifications after their release from the ribosome. Somewhere between 5-10% of the human genome is estimated to code for enzymes that catalyze protein modification. These modifications may involve the formation of disulfide bridges and attachment of any of a number of biochemical functional groups, such as acetate, phosphate, ubiquitin, various lipids and carbohydrates...

Posttranslational modification are effective ways that cells use to control the functions of proteins.

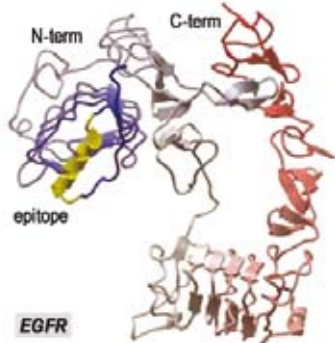
The most famous modifications regard : Protein Partitioning (with Ubiquitination or SUMOylation), Phospho/dephosphorylation, Gene Regulation (with Methylation or Acetylation), but there are also many other protein modifications.

State-of-the-art elucidation of the molecular, biochemical, and cellular aspects of protein modifications in areas as disparate as bacterial pathogenesis, metabolism, organelle integrity, and cancer are beginning to unravel the complexity of events controlling cellular regulation. The changes incurred by protein modifications to achieve such effects are equally wide-ranging, including cellular location, enzyme activity, modulation of signaling pathways, and gene silencing.

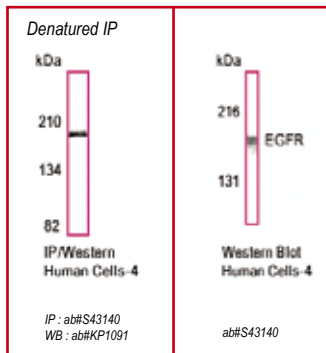
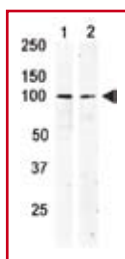
The regulation of these modifications may provide new targets for therapeutic intervention in several human diseases.

Post-translational modifications

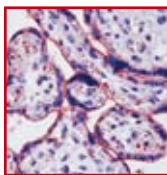
Phosphorylation



The anti-KIT Pab (Cat. #GL4460) is used in Western blot to detect KIT in serum-starved HeLa cell lysate (lane 1) and primate testis tissue lysate (lane 2).



Formalin-fixed, paraffin-embedded human placenta stained with EGFR ab (Cat. #S43140) using peroxidase-conjugate and AEC chromogen. Note membrane staining of trophoblasts.



Kinases in cancer

Because of its key function in signal transduction, the kinase protein family is one of the largest drug target families in the human genome. Recent successful launches of drugs with kinase inhibition as the mode of action demonstrate the effectiveness of this approach.

Tyrosine kinases : a major target

Targeting receptor protein tyrosine kinases (RPTKs) as a cancer chemotherapy has continued to become a compelling approach with time. Preclinical and clinical data strongly support the involvement of specific RPTKs in the formation and progression of a subset of solid and liquid tumors.

Some major targets of well known cancer drugs are : **EGFR** (non-small cell lung cancer), **FLT3**, **KDR**, **ABL** and **c-KIT** (chronic myelogenous leukemia and gastrointestinal stromal tumors), **PDGFR**, **VEGFR**...

Non exhaustive selection of related antibodies (see anti-kinase list for more antibodies p.33)

Cat#	Name	Host	Species react.	Applications
CG3720	ABL (R432)	Rabbit pab	Hu	ELISA BP
AO1621	ABL1 / c-Abl	Rabbit pab	Hu, Ms	WB, IP, IHC SS
GL4880	ABL1 / c-Abl (c-term)	Rabbit pab	Hu	ELISA, IHC BP
Q08100	ABL1 / c-Abl (SH2 domain)	Mouse mab	Hu, Ms	IF, IP, WB, IHC SS
GL4890	ABL2	Rabbit pab	Hu	ELISA, IHC BP
GL4890	ABL phospho, ABL1 phospho : see phosphospecific antibodies list			
N61350	c-KIT / CD117 / SCFR	Mouse mab	Hu	IHC, IP, IF, Block SS
GL4470	c-KIT / CD117 / SCFR (c-term)	Rabbit pab	Hu	ELISA, WB, IHC BP
GL4460	c-KIT / CD117 / SCFR (n-term)	Rabbit pab	Hu	ELISA, WB, IHC BP
N70420	EGFR (aa 6-273), clone EGFR.1	Mouse mab	Hu, Hrs (not Ms)	IHC, IP, IF, FC SS
KM9930	EGFR (center E746)	Rabbit pab	Hu	ELISA BP
S43140	EGFR (extracellular)	Rabbit pab	Hu	IHC, WB, IP BP & SS
N70170	EGFR (extracellular), clone 528	Mouse mab	Hu, Dg (not Ms)	FC, IP, blocking SS
Q22464	EGFR pTyr1016	Rabbit pab	Hu, Ms, Rat	WB
GL4360	Flt-3 (c-term)	Rabbit pab	Hu	ELISA, WB, IHC BP
GL4350	Flt-3 (n-term)	Rabbit pab	Hu	ELISA, WB, IHC BP
V13010	PDGFR alpha (c-term)	Rabbit pab	Hu, Ms, Rat	IHC BP & SS
KM9960	PDGFR alpha (n-term)	Rabbit pab	Hu	ELISA, WB BP
BF1961	PDGFR beta (c-term)	Rabbit pab	Hu, Ms	IHC SS
GL4560	PDGFR beta (n-term)	Rabbit pab	Hu	ELISA, IHC BP
GL4330	VEGFR1 / Flt-1 (c-term)	Rabbit pab	Hu	ELISA, IHC BP
S44483	VEGFR1 / Flt-1 (c-term)	Rabbit pab	Hu, Ms, Rat	IHC SS
GL4320	VEGFR1 / Flt-1 (n-term)	Rabbit pab	Hu	ELISA, IHC BP
GL4340	VEGFR2 / KDR / Flk-1	Rabbit pab	Hu	ELISA, WB, IHC BP
S44421	VEGFR2 / KDR / Flk-1	Rabbit pab	Hu, Ms, Rat	WB, IHC SS

BP = blocking peptide available SS = small size available

Related recombinant proteins

cat #	Name	Applications	Size
KN7340 / KP3830	EGFR (aa 1-203 + GST)	WB, inhibition, EL	5 ug / 10 ug
CG093	Flt-2 / FGFR1	kinase assay	1, 5, 10 & 20 ug
CC789	PDGFR alpha (mouse active kinase)	kinase assay	1, 5, 10 & 20 ug
CG105	PDGFR beta (human active kinase)	kinase assay	1, 5, 10 & 20 ug

Serine-Threonine Kinases : strong candidates on the rise

Although tyrosine kinase inhibitors are the most evaluated kinase inhibitors in clinical trials, a third of kinase inhibitors are targeted against Ser/Thr kinases that belong to the AGC kinase family containing PKA, PKG, PKC kinase families.

The overexpression of **Aurora kinases** can cause abnormality in cells and is known to be oncogenic. As such, Aurora kinases are frequently associated with forms of cancerous growth, including leukemia, colon cancer, and breast cancer tumors. Increased knowledge of Aurora kinases and their regulation will be the basis for treating and even preventing cancer.

Non exhaustive selection of AURORA antibodies (see anti-kinase list for more antibodies p.33)

Cat #	Name	Host	Applications	Species react.
GL5540	AIK (N-term)	rabbit pab	E, WB, IHC	Hu BP
CG1350	Aurora-A	mouse mab	EL, IF, IP, WB	Hu, Ms
GL2010	Aurora-A (N-term E107)	rabbit pab	E, WB	Hu BP
KM7590	Aurora-A (C-term)	rabbit pab	E	Hu BP
HU5430	Aurora-A AbVanced Pack	rabbit pab	WB, IP, IF	Hu, Ms, Rt
AL2010	Aurora-A - agarose immobilized	rabbit pab	IP	Hu
CG1360	Aurora-A - Biotin	Mouse Mab	IF, WB	Hu, Ms
CF1190	Aurora-A (phospho T288)	rabbit pab	ICC	Hu
HU5080	Aurora-B	rabbit pab	WB, IP, IF	Hu BP
GL2000	Aurora-B (C-term)	rabbit pab	E, WB, IHC	Hu BP
GL1991	Aurora-C (C-term)	rabbit pab	E, WB	Hu BP
▶BY9260	Aurora-C (N-term M1)	rabbit pab	E, WB, IF	Hu BP ◀
GR3950	Aurora-C AbVanced Pack	rabbit pab	-	-
GR3570	Aurora-C (mouse) pack	rabbit pab	-	Ms
CG1370	GADD34	goat pab	WB	Hu
GL3050	HSTK12 (N-term)	rabbit pab	E, WB, IHC	Hu BP
▶GL3060	HSTK12 (Center)	rabbit pab	E, WB, IHC	Hu, Ms, Rt, Mo BP ◀
KQ8370	MCM2 (phospho S53)	rabbit pab	IHC	Hu

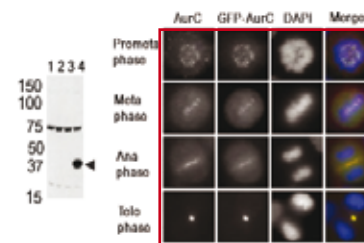
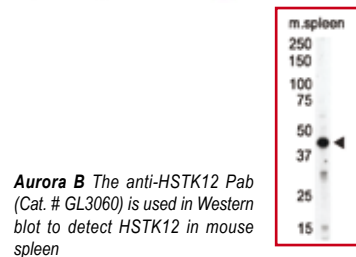
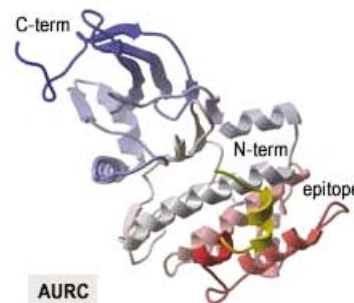
BP = blocking peptide available SS = small size available

Related recombinant proteins

Cat #	Name	Accession #	Size
CG083	Aurora-A active kinase (mouse)	NP_035627	1, 5, 10, 20 µg
CG0790	Aurora-B full-length recombinant protein	AAH09751	10 µg
CG0800	Aurora-B cell lysate	AAH09751	100 µl
CG0770	Aurora-C partial recombinant prot. (aa 186-275)	NP_003151	10 µg

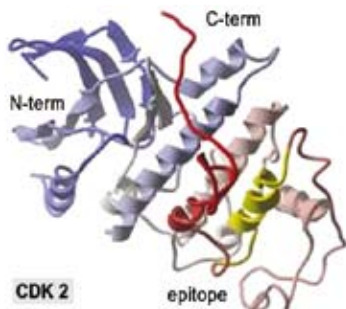
mTOR regulates the response of tumor cells to nutrients and growth factors, and controls tumor blood supply and angiogenesis through effects on VEGF. Inhibitors of protein kinase mTOR are known to give very good results in immunosuppression for organ transplantation.

A new group of anti-cancer drugs referred to as alkylphosphocholines that appear to be potent inhibitors of the activation of **Akt**, a protein associated with tumor survival and growth. Akt is activated in approximately 10-50% of most tumor types and in most anti-cancer therapies, thus involves in resistance to treatment. Once activated, Akt promotes cell survival and cell proliferation.



Post-translational modifications

Phosphorylation

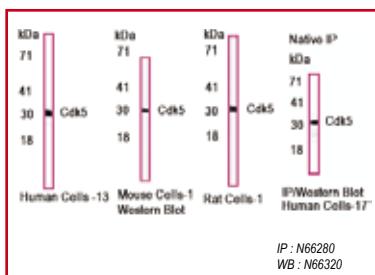


Other kinase targets that belong to the CMGC (containing **CDK**, **MAPK**, **GSK3**, **CLK**) and STE kinase families are studied for drug discovery. The cyclin-dependent kinases (CDK) by their pivotal role in cell cycle are heavily investigated.

Non exhaustive selection of related antibodies (see anti-kinase list for more antibodies)

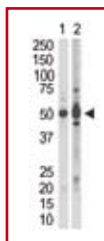
Cat #	Name	Host	Applications	Species react.	
GL2280	AKT1 (C-term)	rabbit Pab	Hu	EL	BP
GL2290	AKT2 (Center)	rabbit Pab	Hu	EL, WB	BP
GL2300	AKT3 (Center)	rabbit Pab	Hu	E, WB, IHC	BP
GL3510	CDK2 (C-term)	rabbit Pab	Hu	E, WB, IHC	BP
▶ N66280	CDK5 (aa 220-227)	rabbit Pab	Hu, Ms, Rat	WB, IP, IF	SS ▶
GL3580	CDK9 (C-term)	rabbit Pab	Hu	EL, IHC	BP
GL3640	CLK2 (N-term)	rabbit Pab	Hu	E, WB	BP
GL7760	GSK3A (C-term)	rabbit Pab	Hu	EL, IHC	BP
KM4900	GSK3B (phospho S21/29)	rabbit Pab	Hu	EL, IHC	BP
▶ GL6140	MAP2K1 (N-term)	rabbit Pab	Hu	E, WB, IHC	BP ▶
GL6160	MAP2K2 (Center)	rabbit Pab	Hu	E, WB, IHC	BP
GL6300	MAP4K3 (C-term)	rabbit Pab	Hu	E, WB, IHC	BP
GL2890	MAPK9 (Center)	rabbit Pab	Hu	E, WB, IHC	BP
AL0930	mTOR	rabbit Pab	Hu, Rat	IP, ICC	BP
AL0940	mTOR	rabbit Pab	Hu, Rat, Ms	WB	BP

BP = blocking peptide available SS = small size available

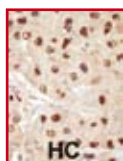


CDK5 detection using antibody # N66280

Western blot analysis of anti-MAP2K1 Pab (Cat. #GL6140) in A375 cell lysate (Lane 1) and mouse brain tissue lysate (Lane 2). Chemiluminescent detection system.



Formalin-fixed and paraffin-embedded human cancer tissue reacted with GL6140 using peroxidase conjugate and AEC chromogen.
HC = hepatocarcinoma.



Related recombinant proteins

Cat #	Name	Applications	Size
CC749	AKT1 active kinase	kinase assay	1, 5, 10, 20 ug
CC750	AKT2 active kinase	kinase assay	1, 5, 10, 20 ug
CC751	AKT3 active kinase	kinase assay	1, 5, 10, 20 ug
KN6740	Cdk4 full lenght	Interactions, WB, Inhibition, ELISA	5 ug
KP3230			
CG088	Cdk5/p25 active kinase	kinase assay	1, 5, 10, 20 ug
CC771	GSK3 active kinase	kinase assay	1, 5, 10, 20 ug
CC776	MAPKAPK2 active kinase	kinase assay	1, 5, 10, 20 ug
CC777	MAPKAPK3 active kinase	kinase assay	1, 5, 10, 20 ug
CG3980	mTOR (aa 1521-1620)	ELISA, WB, Protein array	10, 25 ug

Kinases in Neurodegenerative Diseases

Alzheimer's Disease

Alzheimer's disease (AD) is an age-related progressive neurodegenerative disorder with devastating symptoms in a growing aged population. It is the most common form of dementia affecting about 5% of adults over 65 years. Currently available medications appear to be able to produce moderate symptomatic benefits but not to stop disease progression. The search for novel therapeutic approaches targeting the presumed underlying pathogenic mechanisms has been a major focus of research and it is expected that novel medications with disease-modifying properties will emerge from these efforts in the future, in particular those targeting amyloid α protein and tau pathologies.

Neuropathological characteristics of AD include :

- neuritic plaques (with a core of aggregated amyloid- β peptide)
- neurofibrillary tangles (composed of tau protein in an abnormally hyperphosphorylated form). It appears that the formation of these two protein aggregates is at the root of the pathogenesis of AD, and consequently it is believed that targeting the underlying mechanisms leading to plaques and tangles will ultimately generate novel therapeutics with disease-modifying properties[1].

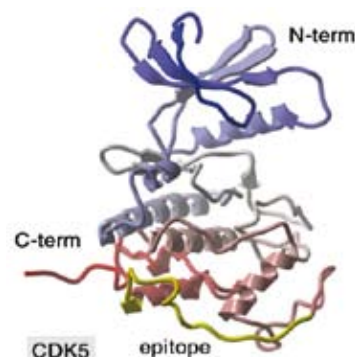
More than 30 phosphorylation sites on tau protein have been described and numerous kinases are able to phosphorylate tau protein in vitro. These include glycogen synthase kinase 3-beta (**GSK3-b**), cdc2-like kinase (**cdk5**), extracellular signal-regulating kinase-2 (**ERK2**), microtubule-affinity-regulating kinase (**MARK**), protein kinase A (**PKA**), members of the stress-activated protein kinase (**SAPK**) family, Ca^{2+} /calmodulin-dependent kinase II and casein kinases I and II [2,3]. Many observations strongly support the use of inhibitors of aberrant phosphorylation of tau as an approach to developing a disease-modifying treatment for AD and other tau-related neurodegenerative diseases.

Besides tau phosphorylation, glutamate transporter regulation by the protein kinase C (**PKC**) family has emerged as a therapeutic area for the prevention of neurodegenerative diseases [4]. Glutamate is the predominant excitatory neurotransmitter in the mammalian central nervous system. Excess activation of glutamate receptors contributes to the loss of neurons observed in several chronic neurodegenerative diseases, such as AD, amyotrophic lateral sclerosis (ALS), and HD. PKC enzymes alter glutamate transporter function by either changing the number of transporters expressed at the cell membrane or by changing the intrinsic activity of the transporters already located at the cell surface. Although the activation of glutamate receptors by PKC enzymes seems to be a ubiquitous mechanism, the different subtypes of PKC have opposite effects depending on cell type and transmitter concentrations. Known inhibitors of PKC isoforms have been efficient in activating one type of response from the glutamate receptors over another, which suggests that inhibiting specific members of the PKC family can regulate glutamate transporter activity on neuron death.

Parkinson's Disease

Parkinson's disease (PD) is the second most common neurodegenerative disorder after AD. Genetic studies of Parkinson's disease have identified key associated mutations in several genes, including **LRRK2**, **PARK7**, **PINK1**, parkin, α -synuclein and **UCHL1** among others. The discovery of different gene defects highlighted the relevance of the ubiquitin proteasome and cell signaling pathways. Like treatment of rats with proteasome inhibitors closely mimics PD in rodents, modification of kinase activity with specific inhibitors provides a very attractive treatment strategy of both familial and sporadic disease.

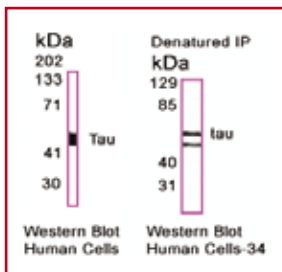
The PTEN-induced kinase 1 (**PINK1/PARK6**) and leucine-rich repeat kinase 2 (**LRRK2/PARK8**) are the only two kinases identified in this mixed pool of enzymes closely related to the ubiquitin proteasome pathway. Little is known about PINK1 and LRRK2 substrates and potential inhibitors, we should expect however in a close future a myriad of projects targeting these kinases.



See related antibodies in the following table and in anti-kinase list p B.33

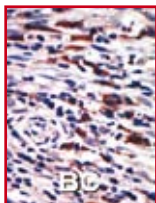
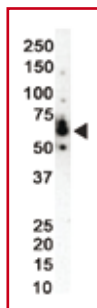
Post-translational modifications

Phosphorylation



TAU detection using antibody
Antibody # 401511

Western blot analysis of anti-PKC eta N-term Pab (Cat. #GL2190) in NCI-H460 cell lysate. Chemiluminescent detection system.



Formalin-fixed and paraffin-embedded human cancer tissue reacted with PKC ab #GL2190 using peroxidase conjugate and AEC chromogen. BC = breast carcinoma.

Non exhaustive selection of related antibodies (see anti-kinase list for more antibodies)

Cat #	Name	Host	Species react.	Application	
AO1231	APP	rabbit pab	Hu, Ms, Rat	IHC, WB	SS
N66320	CDK5	mouse mab	Hu, Ms, Rat	WB, IP, IF	SS
GL3300	ERK1	rabbit pab	Hu, Ms, Rat, Mk	ELISA, WB, IHC	BP
S46103	ERK2	rabbit pab	Hu, Ms, Rat	IHC, IP, WB	SS
GL3340	ERK5	rabbit pab	Hu	ELISA, WB, IHC	BP
GL2060	GRK5	rabbit pab	Hu	ELISA, WB, IHC	BP
GL7770	GSK3	rabbit pab	Hu	ELISA, WB, IHC	BP
GL2930	MARK1	rabbit pab	Hu	ELISA, WB	BP
GL2920	MARK3	rabbit pab	Hu	ELISA, IHC	BP
KM7350	PARK6 / PINK1	rabbit pab	Hu	ELISA, WB, IHC	BP
BY4463	PARK7 / DJ-1	rabbit pab	Hu	IHC, WB	SS
BX3470	PARK8 / LRRK2 ⁽¹⁾	rabbit pab	Hu, Ms	ELISA, WB	BP
KM1650	PARK8 / LRRK2 ⁽¹⁾	mouse ab	Hu, Ms	ELISA, WB	BP
IS7630	PHF (phospho)	mouse mab		ELISA, WB	
GL2480	PKA C-beta	rabbit pab	Hu	ELISA, WB, IHC	BP
GL2150	PKC beta1/2	rabbit pab	Hu	ELISA, WB, IHC	BP
▶ GL2190	PKC eta ⁽²⁾	rabbit pab	Hu	ELISA, WB, IHC	BP ◀
GL2880	SAPK1 / MAPK8	rabbit pab	Hu, Ms	ELISA, WB, IHC	BP
GL2870	SAPK2A / MAPK14	rabbit pab	Hu, Ms	ELISA, WB, IHC	BP
▶ 4015111	TAU	rabbit pab	Hu, Ms, Rat, Shp, Bv	WB, IF	SS ◀

BP = blocking peptide available SS = small size available

⁽¹⁾ more than 16 others available ⁽²⁾ more than 15 others available

Related recombinant proteins

Cat #	Name	Applications	Size
CG088	Cdk5/p25 active kinase	Kinase assay	1, 5, 10, 20 µg
CC766	ERK1 active kinase	Kinase assay	1, 5, 10, 20 µg
CC771	GSK3 active kinase	Kinase assay	1, 5, 10, 20 µg
CC793	PKAcb	Kinase assay	1, 5, 10, 20 µg
CC798	PKCdelta active	Kinase assay	1, 5, 10, 20 µg

10 other PKC available

All kinases are available in 4 different sizes :
for 1 µg size : catalog # ends by 0
for 5 µg size : catalog # ends by 1
for 10 µg size : catalog # ends by 2
for 20 µg size : catalog # ends by 3



Anti-kinases antibodies

These antibodies are rabbit polyclonals except when other host is specified.
Look at the phosphospecific antibody table for phosphorylated kinases.

Cat #	Name		Cat #	Name		Cat #	Name	
GL8350	14-3-3 protein z/d (C-term)	BP	KQ2970	AMPK ALPHA-1	BP	KM8660	BRDT (N-term)	BP
KM8440	AATK (C-term)	BP	GL2650	AMPK alpha1 (C-term)	BP	KN0390	BRSK1 (C-term)	BP
KM4330	ABL (R432)	BP	GL2660	AMPK alpha2 (C-term)	BP	KN0380	BRSK1 (N-term)	BP
GL4880	ABL1 (C-term)	BP	GL5370	ANKRD3 (C-term)	BP	GL4930	BTK (Center)	BP
GL4890	ABL2 (N-term)	BP	GL7710	ANPA (C-term)	BP	GL7000	BUB1A (C-term)	BP
GL4900	ACK1 (C-term)	BP	GL7700	ANPA (N-term)	BP	GL7010	BUB1B (N-term)	BP
KM8460	ACVR1 (Center N153)	BP	GL7730	ANPB (C-term)	BP	KM8680	CABC1 (N-term)	BP
KM8480	ACVR1 (Center N99)	BP	GL7720	ANPB (N-term)	BP	GL2680	CAMK1 (C-term)	BP
GL5340	ACVR1 (Center R147)	BP	GL7740	ANPC (N-term)	BP	GL3180	CAMK1G (C-term)	BP
KM8470	ACVR1 (N-term)	BP	GL5380	ARAF1 (Center)	BP	GL2670	CAMK1-like (C-term)	BP
GL5240	ACVR1B (Center I149)	BP	GL7120	ARK5 (C-term)	BP	GL2690	CAMK2 alpha (C-term)	BP
GL5250	ACVR1B (Center)	BP	GL7110	ARK5 (N-term)	BP	GL2700	CAMK2 beta (C-term)	BP
GL5230	ACVR1B (N-term)	BP	GL6790	ATM (C-term)	BP	GL2720	CAMK2 delta (C-term)	BP
KM8500	ACVR1C (Center)	BP	GL6780	ATM (N-term)	BP	GL2710	CAMK2 delta-like (C-term)	BP
KM8490	ACVR1C (N-term A48)	BP	GL6810	ATR (Center)	BP	GL2730	CAMK2 gamma (C-term)	BP
KM8510	ACVR2A (N-term)	BP	GL6800	ATR (C-term)	BP	HP6990	CAMK4	BP
KM8520	ACVR2A/B (Center)	BP	AL0380	Aurora-A	BP	HP6650	CAMK4	BP
CD3060	ACVR2B (C-term V474)	BP	AL0390	Aurora-A	BP	HP7290	CAMK4	BP
CD3050	ACVR2B (N-term)	BP	KQ2900	Aurora-A	BP	KQ2390	CAMK4	BP
GL5360	ACVRL1 (C-term)	BP	KM7590	Aurora-A (C-term)	BP	GL2740	CAMK4 (C-term)	BP
GL5350	ACVRL1 (N-term)	BP	GL2010	Aurora-A (N-term E107)	BP	HP8280	CAMK4 - abs pack	BP
KN0450	ADCK1 (N-term)	BP	KM7580	Aurora-A (N-term S89)	BP	KM8690	CAMKK2 (N-term)	BP
KN0470	ADCK2 (Center)	BP	HU5430	Aurora-A - abs pack	BP	KM8700	CAMKV (N-term)	BP
KN0460	ADCK2 (C-term)	BP	AL2010	Aurora-A - agarose immobilized	BP	KM8200	CARKL (C-term)	BP
KM8540	ADCK4 (C-term)	BP	CG1360	Aurora-A - Biotin - Mouse Mab	BP	KM8190	CARKL (N-term)	BP
KM8530	ADCK4 (N-term)	BP	CG1380	Aurora-A - Goat Pab	BP	GL2750	Cask (C-term)	BP
KM8560	ADCK5 (C-term)	BP	CG1350	Aurora-A - Mouse Mab	BP	BG0580	CCK4 (C-term)	BP
KM8550	ADCK5 (N-term)	BP	GR3900	Aurora-A (mouse)	BP	BB3040	CCK4 (N-term)	BP
KM8240	ADK (C-term)	BP	CF1100	Aurora-B	BP	KM8710	CCRK (N-term)	BP
KM8230	ADK (N-term)	BP	HU5080	Aurora-B	BP	GH5551	CDC2 P34	SS
GL5540	AIK (N-term)	BP	GL2000	Aurora-B (N-term)	BP	N65390	CDC25A - mouse Mab	SS
GL8490	AK1 (C-term)	BP	KM7570	Aurora-C (Center)	BP	AA7180	CDC25B	SS
GL8480	AK1 (N-term)	BP	GL1991	Aurora-C (C-term)	BP	Q15170	CDC25B	SS
GL8020	AK2 (C-term)	BP	KM7560	Aurora-C (N-term G11)	BP	Q15080	CDC25B - mouse Mab	SS
GL8010	AK2 (N-term)	BP	BY9260	Aurora-C (N-term M1)	BP	GH2650	CDC25C - mouse Mab	SS
GL7980	AK3 (C-term)	BP	BJ0800	Aurora-C (N-term)	BP	N65470	CDC25C - mouse Mab	SS
KN0170	AK3 (C-term)	BP	GR3950	Aurora-C - abs pack	BP	Q15230	CDC25C - mouse Mab	SS
GL7970	AK3 (N-term)	BP	GR3570	Aurora-C (mouse) - abs pack	BP	GL3450	CDC2L1 (C-term)	BP
KN0160	AK3 (N-term)	BP	AG2930	AXL (C-term)	BP	GL3440	CDC2L1 (N-term)	BP
GL7960	AK5 (N-term)	BP	GL3950	AXL (N-term)	BP	GL3460	CDC2L5 (N-term)	BP
KM7970	AK7 (C-term)	BP	GL8520	BAI1 (C-term)	BP	KM8720	CDC42BPA (N-term)	BP
KM7960	AK7 (N-term)	BP	GL8530	BAI2 (C-term)	BP	V09460	CDC7 KINASE - mouse Mab	SS
GL8000	AKL3L (C-term)	BP	GL8540	BAI3 (C-term)	BP	V09460	CDC7 KINASE - mouse Mab	SS
GL7990	AKL3L (N-term)	BP	GL8550	BAIAP1 (C-term)	BP	GL3480	CDC7L1 (C-term)	BP
KP6920	AKT (paired 473)	BP	GL8560	BAIAP2 (C-term)	BP	GL3470	CDC7L1 (N-term)	BP
CF5820	AKT (SER473)	BP	GL8570	BAIAP3 (C-term)	BP	GL3500	CDK1 (C-term)	BP
GL2280	AKT1 (C-term)	BP	KM8620	BCKDK (Center)	BP	N65780	CDK1 - mouse Mab	SS
BY4490	AKT1 (paired 308)	BP	KM8220	BCKDK (C-term T340)	BP	Q15620	CDK1 - mouse Mab	SS
BY4500	AKT1 (paired 473)	BP	KM8630	BCKDK (C-term)	BP	960871	CDK1 / P34 CDC2	SS
GL2290	AKT2 (Center)	BP	KM8210	BCKDK (N-term)	BP	GL3510	CDK2 (C-term)	BP
GL2300	AKT3 (Center)	BP	KM8640	BCR (N-term)	BP	N65900	CDK2 - mouse Mab	SS
GL3940	ALK (C-term)	BP	GL6990	BGLF4 (C-term)	BP	N66000	CDK2 - mouse Mab	SS
GL3930	ALK (N-term)	BP	GL6980	BGLF4 (N-term)	BP	Q15790	CDK2 - mouse Mab	SS
KP0381	ALK / P80	SS	KM8650	BIKE (C-term)	BP	N66020	CDK3	SS
N59150	ALK / P80 - mouse Mab	SS	GL4910	BLK (N-term)	BP	GL3520	CDK3 (C-term)	BP
V17200	ALK / P80 - rabbit Mab	SS	GL4920	BMX (Center)	BP	N66160	CDK4	SS
KM8580	ALPK1 (C-term)	BP	GL5390	BRAF (N-term)	BP	GL3530	CDK4 (C-term)	BP
KM8570	ALPK1 (N-term)	BP	GL6830	BRD1 (C-term)	BP	904821	CDK4 - mouse Mab	SS
KM8600	ALS2CR2 (C-term)	BP	GL6820	BRD1 (N-term)	BP	N66061	CDK4 - mouse Mab	SS
KM8590	ALS2CR2 (N-term)	BP	GL6840	BRD2 (Center)	BP	N66080	CDK4 - mouse Mab	SS
GL3430	ALS2CR7 (N-term)	BP	GL6850	BRD3 (C-term)	BP	Q15980	CDK4 - mouse Mab	SS
KM8610	AMHR2 (N-term)	BP	GL6870	BRD4 (C-term)	BP	S47590	CDK5	SS
AL0950	AMPK ALPHA 1	BP	GL6860	BRD4 (N-term)	BP	GL3540	CDK5 (C-term)	BP
AL0960	AMPK ALPHA 2	BP	KM8670	BRDT (Center)	BP	N66240	CDK5 - mouse Mab	SS

BP = blocking peptide available SS = small size available

Post-translational modifications

Phosphorylation



Anti-kinases antibodies (continued)

Cat #	Name	Cat #	Name	Cat #	Name
N66280	CDK5 - mouse Mab	SS	KM7690	CKB (Center)	BP
N66320	CDK5 - mouse Mab	SS	KM7680	CKB (N-term)	BP
Q16230	CDK5 - mouse Mab	SS	GR4220	CKII ALPHA	BP
KP8790	CDK6	SS	KQ2700	CKII ALPHA	BP
GL3550	CDK6 (C-term)	BP	GR4780	CKII ALPHA	BP
N66370	CDK6 - mouse Mab	SS	GR5970	CKII ALPHA	BP
N66400	CDK6 - mouse Mab	SS	AY6940	CKII ALPHA	BP
N66430	CDK6 - mouse Mab	SS	HU5790	CKII ALPHA - abs pack	BP
Q16360	CDK6 - mouse Mab	SS	KM7900	CKM (C-term)	BP
HP7340	CDK7	BP	KM7890	CKM (N-term)	BP
GL3560	CDK7 (C-term)	BP	KM7860	CKMT1 (C-term)	BP
KM4640	CDK7 (phospho T170)	BP	KM7850	CKMT1 (N-term)	BP
GH4670	CDK7 - mouse Mab	SS	KM7880	CKMT2 (C-term)	BP
N66510	CDK7 - mouse Mab	SS	KM7870	CKMT2 (N-term)	BP
N66540	CDK8	SS	GL3630	CLK1 (N-term)	BP
GL3570	CDK8 (N-term)	BP	GL3640	CLK2 (N-term)	BP
GL3580	CDK9 (C-term)	BP	GL3650	CLK3 (N-term)	BP
KM8730	CDK10 (N-term R5)	BP	GL3660	CLK4 (N-term)	BP
GL3490	CDK10 (N-term)	BP	GL6110	COT (C-term)	BP
KQ6720	CDK11	BP	GL3680	CRK7 (C-term)	BP
BI0000	CDK11	BP	GL3670	CRK7 (N-term)	BP
BI0010	CDK11	BP	GL3970	CSF1R (C-term)	BP
HU6100	CDK11 - abs pack	BP	GL3960	CSF1R (N-term)	BP
GL3600	CDKL1 (C-term)	BP	GL4940	CSK (C-term)	BP
GL3590	CDKL1 (N-term)	BP	GL8210	CSNK2A1 (Center)	BP
KM8740	CDKL2 (Center)	BP	GL7950	CSNK2A2 (C-term)	BP
GL3610	CDKN1A (C-term)	BP	KM7950	CSNK2B (C-term F168)	BP
GL3620	CDKN3 (C-term)	BP	KM7940	CSNK2B (C-term)	BP
KM8180	CERK (C-term)	BP	KM7930	CSNK2B (N-term)	BP
KM8170	CERK (N-term)	BP	GL2310	DAPK1 (C-term)	BP
GL6310	cGKI beta (C-term)	BP	GL2770	DAPK1 (C-term)	BP
GL6320	cGKI (C-term)	BP	GL2780	DAPK2 (N-term V55)	BP
GL6890	CHAK1 (C-term)	BP	GL2320	DAPK2 (N-term)	BP
GL6880	CHAK1 (N-term)	BP	KM8790	DAPK3 (Center)	BP
GL6910	CHAK2 (Center)	BP	KM8780	DAPK3 (N-term)	BP
GL6900	CHAK2 (C-term)	BP	GL2800	DCAMKL1 (C-term)	BP
KN0480	CHK (C-term)	BP	GL2790	DCAMKL1 (N-term)	BP
KM7740	CHK (N-term)	BP	KM8800	DCAMKL2 (N-term)	BP
KQ3670	CHK1	BP	KM3630	DCAMKL3 (Center)	BP
GR5050	CHK1	BP	BX4170	DCK (C-term)	BP
GL3200	CHK1 (C-term)	BP	KM8160	DCK (N-term)	BP
BY9290	CHK1 (N-term) - mouse Mab	BP	GL7920	DGKA (C-term)	BP
HU5690	CHK1 - abs pack	BP	GL7910	DGKA (N-term)	BP
AL0630	CHK1 - goat pab	BP	GL7900	DGKB (C-term)	BP
GR5550	CHK1 - goat pab	BP	GL7890	DGKB (N-term)	BP
S39410	CHK1 - mouse Mab	SS	GL7880	DGKD (C-term)	BP
AL0640	CHK1 PSER317	BP	GL7870	DGKD (N-term)	BP
KQ0920	CHK2	BP	GL7860	DGKE (C-term)	BP
KQ1030	CHK2	BP	GL7850	DGKE (N-term)	BP
KQ6750	CHK2	BP	GL7840	DGKG (C-term)	BP
KQ6370	CHK2	BP	GL7830	DGKG (N-term)	BP
GL3260	CHK2 (C-term)	BP	GL7820	DGKI (C-term)	BP
GR3490	CHK2 - abs pack	BP	GL7810	DGKI (N-term)	BP
KQ2400	CHK2 - abs pack	BP	GL7800	DGKQ (C-term)	BP
CE7365	CHK2 - mouse Mab	SS	GL7790	DGKQ (N-term)	BP
Q18290	CHK2 - mouse Mab	SS	GL7030	DGKZ (C-term)	BP
S39460	CHK2 - mouse Mab	SS	GL7020	DGKZ (N-term)	BP
KM7760	CHKL (C-term)	BP	KM8150	DGUOK (C-term)	BP
KM7750	CHKL (N-term)	BP	KM8140	DGUOK (N-term)	BP
KM8750	CHUK (Center)	BP	GL2330	DMPK (C-term)	BP
KM8760	CIT (Center)	BP	HP6570	DNA-PKCS	BP
KM8770	CIT (C-term)	BP	HP6560	DNA-PKCS	BP
GL3190	CK1a (C-term)	BP	HP6620	DNA-PKCS	BP
GL3210	CK1d (C-term)	BP	HP6670	DNA-PKCS	BP
GL3220	CK1e (C-term)	BP	KQ5470	DNA-PKCS	BP
GL3230	CK1g1 (C-term)	BP	HP8180	DNA-PKCS - abs pack	BP
GL3240	CK1g2 (C-term)	BP	GL4850	DOK1 (N-term)	BP
GL3250	CK1g3 (C-term)	BP	GL4870	DOK2 (C-term)	BP
GL4860	DOK2 (N-term)	BP	GL4860	DOK2 (N-term)	BP
BB1040	DOK4 (C-term)	BP	KN0000	DOK5 (Center)	BP
KN0000	DOK5 (Center)	BP	BB1050	DOK5 (C-term)	BP
BB1050	DOK5 (C-term)	BP	KM9990	DOK5 (N-term)	BP
KM9990	DOK5 (N-term)	BP	KM9940	DOK6 (Center)	BP
KM9940	DOK6 (Center)	BP	KM9950	DOK6 (C-term)	BP
KM9950	DOK6 (C-term)	BP	GL2810	DRAK1 (N-term)	BP
GL2810	DRAK1 (N-term)	BP	GL2820	DRAK2 (C-term)	BP
GL2820	DRAK2 (C-term)	BP	KM7710	DTYMK (C-term)	BP
KM7710	DTYMK (C-term)	BP	KM7700	DTYMK (N-term)	BP
KM7700	DTYMK (N-term)	BP	GL3690	DYRK2 (N-term)	BP
GL3690	DYRK2 (N-term)	BP	GL3700	DYRK3 (N-term)	BP
GL3700	DYRK3 (N-term)	BP	GL3710	DYRK4 (C-term)	BP
GL3710	DYRK4 (C-term)	BP	GL3720	DYRKA (N-term)	BP
GL3720	DYRKA (N-term)	BP	GL3730	DYRKB (C-term)	BP
GL3730	DYRKB (C-term)	BP	KN0280	EEF2K (C-term)	BP
KN0280	EEF2K (C-term)	BP	KN0270	EEF2K (N-term)	BP
KN0270	EEF2K (N-term)	BP	Q22464	EGFR	BP
Q22464	EGFR	BP	Q22467	EGFR	SS
Q22467	EGFR	SS	S43140	EGFR	SS
S43140	EGFR	SS	KM9930	EGFR (Center E746)	BP
KM9930	EGFR (Center E746)	BP	KM9900	EGFR (Center Q858)	BP
KM9900	EGFR (Center Q858)	BP	KM9920	EGFR (Center Q861)	BP
KM9920	EGFR (Center Q861)	BP	KM9910	EGFR (Center R858)	BP
KM9910	EGFR (Center R858)	BP	GH5130	EGFR - mouse Mab	SS
GH5130	EGFR - mouse Mab	SS	KP1091	EGFR - mouse Mab	SS
KP1091	EGFR - mouse Mab	SS	N70170	EGFR - mouse Mab	SS
N70170	EGFR - mouse Mab	SS	N70200	EGFR - mouse Mab	SS
N70200	EGFR - mouse Mab	SS	N70250	EGFR - mouse Mab	SS
N70250	EGFR - mouse Mab	SS	N70280	EGFR - mouse Mab	SS
N70280	EGFR - mouse Mab	SS	N70300	EGFR - mouse Mab	SS
N70300	EGFR - mouse Mab	SS	N70360	EGFR - mouse Mab	SS
N70360	EGFR - mouse Mab	SS	N70380	EGFR - mouse Mab	SS
N70380	EGFR - mouse Mab	SS	N70400	EGFR - mouse Mab	SS
N70400	EGFR - mouse Mab	SS	N70420	EGFR - mouse Mab	SS
N70420	EGFR - mouse Mab	SS	N70430	EGFR - mouse Mab	SS
N70430	EGFR - mouse Mab	SS	N70480	EGFR - mouse Mab	SS
N70480	EGFR - mouse Mab	SS	Q22360	EGFR - mouse Mab	SS
Q22360	EGFR - mouse Mab	SS	V08460	EGFR - mouse Mab	SS
V08460	EGFR - mouse Mab	SS	GH3522	EGFR - rabbit Mab	SS
GH3522	EGFR - rabbit Mab	SS	GL8320	EIF2AK3 (C-term)	BP
GL8320	EIF2AK3 (C-term)	BP	KM7800	EK11 (C-term)	BP
KM7800	EK11 (C-term)	BP	KM7790	EK11 (N-term)	BP
KM7790	EK11 (N-term)	BP	KN0300	EK12 (C-term)	BP
KN0300	EK12 (C-term)	BP	KN0290	EK12 (N-term)	BP
KN0290	EK12 (N-term)	BP	GL6340	EMK (C-term)	BP
GL6340	EMK (C-term)	BP	GL3990	EphA1 (C-term)	BP
GL3990	EphA1 (C-term)	BP	GL3980	EphA1 (N-term)	BP
GL3980	EphA1 (N-term)	BP	GL4010	EphA2 (C-term)	BP
GL4010	EphA2 (C-term)	BP	GL4000	EphA2 (N-term)	BP
GL4000	EphA2 (N-term)	BP	GL4030	EphA3 (C-term)	BP
GL4030	EphA3 (C-term)	BP	GL4020	EphA3 (N-term)	BP
GL4020	EphA3 (N-term)	BP	GL4050	EphA4 (C-term)	BP
GL4050	EphA4 (C-term)	BP	GL4040	EphA4 (N-term)	BP
GL4040	EphA4 (N-term)	BP	GL4070	EphA5 (C-term)	BP
GL4070	EphA5 (C-term)	BP	GL4060	EphA5 (N-term)	BP
GL4060	EphA5 (N-term)	BP	GL4090	EphA6 (C-term) (mouse)	BP
GL4090	EphA6 (C-term) (mouse)	BP	GL4080	EphA6 (N-term) (mouse)	BP
GL4080	EphA6 (N-term) (mouse)	BP	GL4110	EphA7 (C-term)	BP
GL4110	EphA7 (C-term)	BP	GL4100	EphA7 (N-term)	BP
GL4100	EphA7 (N-term)	BP	GL4130	EphA8 (C-term)	BP
GL4130	EphA8 (C-term)	BP	GL4120	EphA8 (N-term)	BP
GL4120	EphA8 (N-term)	BP	GL4140	EphB1 (C-term)	BP
GL4140	EphB1 (C-term)	BP	GL4160	EphB2 (C-term)	BP
GL4160	EphB2 (C-term)	BP	GL4150	EphB2 (N-term)	BP
GL4150	EphB2 (N-term)	BP	GL4170	EphB3 (N-term)	BP
GL4170	EphB3 (N-term)	BP	GL4180	EphB4 (C-term)	BP
GL4180	EphB4 (C-term)	BP			

BP = blocking peptide available SS = small size available

Anti-kinases antibodies (continued)

Cat #	Name	Cat #	Name	Cat #	Name			
GL4200	EphB6 (C-term H990)	BP	KM8050	GALK1 (N-term)	BP	N66970	HER-2 - mouse Mab	SS
KM8820	EphB6 (C-term V897)	BP	KM8080	GALK2 (C-term)	BP	N67080	HER-2 - mouse Mab	SS
KM8810	EphB6 (N-term E121)	BP	KM8070	GALK2 (N-term)	BP	N67100	HER-2 - mouse Mab	SS
GL4190	EphB6 (N-term S45)	BP	GL5570	GCK (C-term)	BP	N67120	HER-2 - mouse Mab	SS
GL8290	EPS8 (C-term)	BP	GL5550	GCK (N-term)	BP	N67170	HER-2 - mouse Mab	SS
GL8280	EPS8 (N-term)	BP	GL8200	GCKR (C-term)	BP	Q17030	HER-2 - mouse Mab	SS
GL4220	ErbB1 (C-term)	BP	GL8190	GCKR (N-term)	BP	Q17200	HER-2 - mouse Mab	SS
GL4210	ErbB1 (N-term)	BP	KQ4060	GCN2	BP	Q17430	HER-2 - mouse Mab	SS
KQ5230	ERBB2	BP	KM8870	GCN2 (N-term R181)	BP	Q17580	HER-2 - mouse Mab	SS
KQ5140	ERBB2	BP	KM8880	GCN2 (Center D762)	BP	V16950	HER-2 - rabbit Mab	SS
KQ5340	ERBB2	BP	GL7070	GCN2 (Center F1116)	BP	GH5702	HER-3	SS
KQ7900	ERBB2	BP	KM8860	GCN2 (N-term G11)	BP	N67250	HER-3	SS
KQ8610	ERBB2 - abs pack	BP	GL6370	GLK (C-term)	BP	GH2900	HER-3 - mouse Mab	SS
GL4250	ErbB3 (N-term)	BP	GL6360	GLK (N-term)	BP	N67300	HER-3 - mouse Mab	SS
KQ4070	ERBB4	BP	GL7080	GNB2L1 (N-term)	BP	N67320	HER-3 - mouse Mab	SS
KQ4150	ERBB4	BP	KM8890	GPK2 (C-term)	BP	N67324	HER-3 - mouse Mab	SS
GL4270	ErbB4 (C-term)	BP	GL2020	GRK1 (C-term)	BP	N67340	HER-3 - mouse Mab	SS
GL4260	ErbB4 (N-term)	BP	GL2030	GRK2 (C-term)	BP	N67370	HER-3 - mouse Mab	SS
KQ7410	ERBB4 - abs pack	BP	GL2040	GRK3 (C-term)	BP	N67400	HER-3 - mouse Mab	SS
V15773	ERK1	SS	GL2050	GRK4 (C-term)	BP	N67420	HER-3 - mouse Mab	SS
V15790	ERK1	SS	GL2060	GRK5 (C-term)	BP	AK7201	HER-4	SS
GL3300	ERK1 (N-term)	BP	GL2070	GRK6 (C-term)	BP	N67490	HER-4	SS
S46103	ERK2	SS	KM8900	GRK6 (N-term)	BP	759040	HER-4 - mouse Mab	SS
GL3310	ERK2 (C-term)	BP	GL5220	GRK7 (C-term)	BP	759070	HER-4 - mouse Mab	SS
GL3320	ERK3 (C-term)	BP	GL8180	GRK7 (C-term)	BP	N67484	HER-4 - mouse Mab	SS
GL3330	ERK4 (C-term)	BP	GL8170	GRK7 (N-term)	BP	N67501	HER-4 - mouse Mab	SS
GL3340	ERK5 (C-term)	BP	GH6205	GSK3	SS	N67510	HER-4 - mouse Mab	SS
KM8840	ERN2 (C-term)	BP	GL7760	GSK3A (C-term)	BP	GL6350	HGK (C-term)	BP
KM8830	ERN2 (N-term)	BP	GL7750	GSK3A (N-term)	BP	CE8370	HIPK1 (N-term)	BP
857891	FAK	SS	GL7780	GSK3B (C-term)	BP	GL3770	HIPK2 (C-term D1050)	BP
GL4960	FAK1 (N-term)	BP	GL7770	GSK3B (N-term)	BP	GL3750	HIPK2 (C-term)	BP
GL4970	FAK2 (N-term)	BP	V10920	GSK3BETA	SS	GL3760	HIPK2 (N-term T104)	BP
KM8850	FASTK (Center)	BP	KP7440	GSK3A (paired 21)		GL3740	HIPK2 (N-term)	BP
KM8120	FASTK (C-term)	BP	KP7450	GSK3A (SER21)		GL3790	HIPK3 (Center)	BP
KM8110	FASTK (N-term)	BP	KP7460	GSK3B (paired 9)		GL3780	HIPK3 (C-term)	BP
GL4980	FER (C-term)	BP	KP7470	GSK3B (SER9)		KM8990	HIPK4 (C-term)	BP
GL4990	FES (N-term)	BP	KN0440	GUCY1A2 (C-term)	BP	KM8980	HIPK4 (N-term)	BP
GL8310	FGF4 (C-term)	BP	KM8910	GUCY1A2 (N-term)	BP	GL8160	HK1 (C-term)	BP
GL8300	FGF4 (N-term)	BP	KM8930	GUCY1A3 (C-term)	BP	GL8150	HK1 (N-term)	BP
GL4280	FGFR1 (C-term)	BP	KM8920	GUCY1A3 (N-term)	BP	KN0240	HK1-R468 (Center)	BP
BB6920	FGFR1 (N-term)	BP	KM8950	GUCY1B2 (C-term)	BP	GL8140	HK2 (Center)	BP
GL4290	FGFR2 (C-term)	BP	KM8940	GUCY1B2 (N-term)	BP	KN0230	HK2 (Center)	BP
AN5640	FGFR2 (N-term)	BP	KN0430	GUCY1B3 (Center)	BP	GL8130	HK2 (N-term)	BP
GL4300	FGFR3 (C-term)	BP	KN0420	GUCY1B3 (C-term)	BP	KN0220	HK2 (N-term)	BP
GL4310	FGFR4 (N-term)	BP	KM8960	GUCY2C (Center)	BP	GL8120	HK3 (C-term)	BP
GL5000	FGR (N-term)	BP	KM8970	GUCY2C (C-term)	BP	KN0210	HK3 (C-term)	BP
GL4330	FLT1 (C-term)	BP	KM7840	GUK1 (Center)	BP	GL8110	HK3 (N-term)	BP
GL4320	FLT1 (N-term)	BP	KM7830	GUK1 (N-term)	BP	KN0200	HK3 (N-term)	BP
S44483	FLT1/VEGFR1	SS	GL7090	Haspin GSG2 (Center)	BP	GL6290	HPK1 (C-term)	BP
S44490	FLT1/VEGFR1	SS	GL5030	HCK (N-term)	BP	GL7100	HRI (N-term)	BP
GL4360	FLT3 (C-term)	BP	BH9150	HCK - abs pack	BP	KM9000	HSPB8 (N-term)	BP
GL4350	FLT3 (N-term)	BP	AA6811	HER-2	SS	GL3060	HSTK12 (Center)	BP
GH5641	FLT4	SS	N66810	HER-2	SS	GL3050	HSTK12 (N-term)	BP
GL4380	FLT4 (C-term)	BP	N67190	HER-2 (anti rat) - mouse Mab	SS	GL6090	HUNK (C-term)	BP
GL4370	FLT4 (N-term)	BP	GL4240	HER-2 (C-term)	BP	GL3800	ICK (C-term)	BP
KM8100	FN3K (C-term)	BP	GL4230	HER-2 (N-term)	BP	GL4400	IGF1R (C-term)	BP
KM8090	FN3K (N-term)	BP	KM4930	HER-2 (phospho Y1112)	BP	GL4390	IGF1R (N-term)	BP
KM7770	FN3X (Center)	BP	KP7140	HER-2 (Y1221)		GL7670	IKK alpha	BP
KM7780	FN3X (C-term)	BP	KP7150	HER-2 (Y1221/1222)		GK2540	IKK alpha - mouse Mab	BP
GL5010	FRK (N-term)	BP	KP7160	HER-2 (Y1222)		GL7680	IKK beta	BP
KN0330	Fucokinase (C-term)	BP	KP7170	HER-2 (Y877)		GK2550	IKK beta - mouse Mab	BP
KN0320	Fucokinase (N-term)	BP	928611	HER-2 - mouse Mab	SS	GK2560	IKK beta - mouse Mab	BP
GL5020	FYN (N-term)	BP	928621	HER-2 - mouse Mab	SS	GL7690	IKK gamma	BP
CG1370	GADD34 - Goat Pab		928631	HER-2 - mouse Mab	SS	GK2570	IKK gamma - mouse Mab	BP
GL7060	GAK (Center)	BP	KP8950	HER-2 - mouse Mab	SS	GK2580	IKK gamma - mouse Mab	BP
GL7050	GAK (C-term)	BP	KP8990	HER-2 - mouse Mab	SS	V11860	IKKBETA	SS
GL7040	GAK (N-term)	BP	N66880	HER-2 - mouse Mab	SS	GL8100	IKKE (C-term)	BP
KM8060	GALK1 (C-term)	BP	N66920	HER-2 - mouse Mab	SS	GL8090	IKKE (N-term)	BP

BP = blocking peptide available SS = small size available

Post-translational modifications

Phosphorylation



Anti-kinases antibodies (continued)

Cat #	Name	Cat #	Name	Cat #	Name			
GL4420	ILK1 (C-term)	BP	GL4480	LTK (N-term)	BP	GL5740	MKK7 (C-term)	BP
GL4410	ILK1 (N-term)	BP	KM9020	LTK2 (C-term)	BP	KM9160	MKNK1 (C-term)	BP
KM7990	ILK2 (C-term)	BP	KM9040	LYK5 (C-term)	BP	KM9150	MKNK1 (N-term)	BP
KM7980	ILK2 (N-term)	BP	KM9030	LYK5 (N-term)	BP	KM9170	MKNK2 (C-term)	BP
GL4430	INSR (N-term)	BP	GL5060	LYN (N-term)	BP	KM7670	MKNK2 (N-term)	BP
GL4450	INSRR (C-term)	BP	GL6390	LZK (C-term)	BP	GL6220	MLCK (N-term)	BP
GL4440	INSRR (N-term)	BP	GL3810	MAK (C-term)	BP	GL6210	MLCK2 (N-term)	BP
GL5270	IRAK1 (C-term)	BP	GL6140	MAP2K1 (N-term)	BP	GL6230	MLCK-long (N-term)	BP
GL5260	IRAK1 (N-term)	BP	GL6160	MAP2K2 (Center)	BP	GL8580	Mif1	BP
GL5290	IRAK2 (C-term)	BP	GL6150	MAP2K2 (N-term)	BP	GL5750	MLK1 (C-term)	BP
GL5280	IRAK2 (N-term)	BP	GL6180	MAP2K6 (C-term)	BP	GL5760	MLK2 (C-term)	BP
GL5310	IRAK3 (C-term)	BP	GL6170	MAP2K6 (N-term)	BP	GL5770	MLK3 (C-term)	BP
GL5300	IRAK3 (N-term)	BP	GL6200	MAP3K9 (C-term)	BP	GL6330	MLK4 alpha/beta (N-term)	BP
GL5330	IRAK4 (C-term)	BP	GL6190	MAP3K9 (N-term)	BP	KM9180	MLKL (N-term)	BP
GL5320	IRAK4 (N-term)	BP	KM9110	MAP3K15 (N-term)	BP	GL7140	MLKLAK (Center)	BP
GL5040	ITK (Center)	BP	BI2670	MAP4K2 (Center)	BP	KM9200	MNK1 (C-term)	BP
KN0350	ITPKA (C-term)	BP	GL2880	MAPK8 (Center)	BP	KM9190	MNK1 (N-term)	BP
KN0340	ITPKA (N-term)	BP	GL2890	MAPK9 (Center)	BP	GL3820	MOK (C-term)	BP
KN0370	ITPKB (C-term)	BP	GL2830	MAPK10 (N-term)	BP	GL7150	MOS (N-term)	BP
KN0360	ITPKB (N-term)	BP	GL2840	MAPK11 (Center)	BP	KM5180	MSK (phospho S360)	BP
GK3290	JAK1 (C-term)	BP	GL2850	MAPK12 (Center)	BP	GL2080	MSK1 (N-term)	BP
GK3300	JAK2 (C-term)	BP	GL2860	MAPK13 (Center)	BP	GL2090	MSK2 (C-term R321)	BP
GL5580	JIK (C-term)	BP	GL2870	MAPK14 (Center)	BP	GL2100	MSK2 (C-term)	BP
KQ7990	JIK/TAOK3	BP	GL2910	MAPKAPK2 (C-term)	BP	GL2110	MSK2 (N-term)	BP
KQ1620	JIK/TAOK3	BP	GL2900	MAPKAPK2 (N-term)	BP	GL3830	MSSK1 (Center)	BP
KQ8360	JIK/TAOK3 - abs pack	BP	GL2930	MARK (C-term)	BP	BT0800	MST1	BP
GL3350	JNK1 (C-term)	BP	KM9060	MARK1 (C-term)	BP	GL5780	MST1 (C-term)	BP
GL3370	JNK2 (C-term K373)	BP	KM9050	MARK1 (N-term)	BP	BT0840	MST1,2/STK3,4 - abs pack	BP
GL3360	JNK2 (C-term)	BP	GL2920	MARK3 (C-term)	BP	BT0810	MST1/2	BP
GL3380	JNK3 (N-term)	BP	KM9080	MARK4 (C-term)	BP	BT0830	MST1/2	BP
S44421	KDR/FLK1	SS	KM9070	MARK4 (N-term)	BP	BT0820	MST2	BP
S44430	KDR/FLK1	SS	KM9090	MAST3 (Center)	BP	GL5790	MST2 (C-term)	BP
GL4340	KDR/FLK1 (C-term)	BP	KM9100	MASTL (N-term)	BP	KQ4280	MST3	BP
KM7820	KHK (C-term)	BP	GL5070	MATK (N-term)	BP	GL5800	MST3 (C-term)	BP
KM7810	KHK (N-term)	BP	GL4510	MCK10 (C-term)	BP	KQ8120	MST4	BP
GL6380	KHS (C-term)	BP	GL4500	MCK10 (N-term)	BP	KQ4440	MST4	BP
GL6300	KHS2 (C-term)	BP	V11650	MEK1	SS	GL5810	MST4 (C-term)	BP
CD4421	Kif5B-1 (Central)	BP	GL5600	MEK1 (N-term)	BP	KQ7480	MST4/MASK - abs pack	BP
GL8460	KIP2 (C-term)	BP	V11720	MEK2	SS	AL0930	mTOR	BP
GL8450	KIP2 (N-term)	BP	GL5610	MEK2 (N-term)	BP	AL0940	mTOR	BP
GL7130	KIS (N-term)	BP	KP7630	MEK2 (paired 394)	BP	HU6380	mTOR - abs pack	BP
KN0150	KIS (N-term)	BP	KP7640	MEK2 (T394)	BP	GL4540	MUSK (C-term)	BP
KM7730	KIST (C-term)	BP	GL5620	MEK5 (C-term)	BP	GL4530	MUSK (N-term)	BP
GH5672	KIT	SS	V11790	MEK6	SS	KN0410	MVP (C-term)	BP
R30851	KIT	SS	V15650	MEKK1	SS	KN0400	MVP (N-term)	BP
GL4470	KIT (C-term)	BP	GL5630	MEKK1 (C-term)	BP	KM9210	MYO3B (N-term)	BP
GL4460	KIT (N-term)	BP	GL5640	MEKK2 (N-term)	BP	KM8040	NAGK (C-term)	BP
N61330	KIT - mouse Mab	SS	GL5650	MEKK3 (N-term)	BP	KM8030	NAGK (N-term)	BP
N61350	KIT - mouse Mab	SS	GL5660	MEKK4 (C-term)	BP	GL8470	NDK8 (C-term)	BP
N61370	KIT - mouse Mab	SS	GL5670	MEKK5 (C-term)	BP	GL7180	NEK1 (C-term)	BP
N61390	KIT - mouse Mab	SS	GL5680	MEKK6 (C-term)	BP	GL7160	NEK11L (C-term)	BP
GL5410	KSR1 (N-term)	BP	GL5690	MEKK8 (C-term)	BP	GL7170	NEK11S/L (Center)	BP
GL2340	LATS1 (N-term)	BP	KM9120	MELK (Center)	BP	GL7200	NEK2 (Center)	BP
GL2350	LATS2 (Center)	BP	KM9130	MELK (C-term)	BP	GL7190	NEK2B (Center)	BP
GL5420	LIMK1 (N-term)	BP	GL4520	MERK (C-term)	BP	GL7210	NEK3 (Center)	BP
GL5440	LIMK2 (N-term)	BP	BC0240	MERK (N-term)	BP	GL7220	NEK4 (C-term)	BP
GL5430	LIMK2B (N-term)	BP	GR4650	MERTK/C-MER	BP	GL7230	NEK6 (N-term)	BP
KM9010	LMTK2 (N-term)	BP	GK2200	MET/HGFR - mouse Mab	BP	GL7240	NEK7 (N-term)	BP
HP6860	LOK	BP	GK2210	MET/HGFR - mouse Mab	BP	KM8290	NEK8 (C-term)	BP
HP6610	LOK	BP	GK2220	MET/HGFR - mouse Mab	BP	KM8280	NEK8 (N-term)	BP
GL6130	LOK (C-term E707)	BP	GK2230	MET/HGFR - mouse Mab	BP	GL7250	NEK9 (C-term)	BP
GL5590	LOK (C-term)	BP	GK2240	MET/HGFR - mouse Mab	BP	GL6240	NIK (Center)	BP
GL6120	LOK (N-term)	BP	GK2250	MET/HGFR - mouse Mab	BP	GL3840	NLK (C-term)	BP
HU6350	LOK - abs pack	BP	KM9140	MGC42105 (N-term)	BP	BH9190	NLK - abs pack	BP
KM8320	LRRK1 (C-term)	BP	GL5700	MINK1/2 (C-term)	BP	N79750	NM23 / NDP KINASE	SS
KM8310	LRRK1 (N-term)	BP	GL5710	MINK3 (N-term)	BP	GL7260	NME1 (N-term)	BP
GL5050	LSK (N-term)	BP	GL5720	MKK4 (C-term)	BP	GL7270	NME2 (N-term)	BP
GL4490	LTK (C-term)	BP	GL5730	MKK6 (N-term)	BP	KM9220	NME3 (Center)	BP

BP = blocking peptide available SS = small size available

Anti-kinases antibodies (continued)

Cat #	Name	Cat #	Name	Cat #	Name			
KM9230	NME3 (C-term)	BP	KM8330	PARK8 (N-term)	BP	GL6420	PI3KC2B (N-term)	BP
GL8370	NME4 (C-term)	BP	KM8420	PARK8 (Y2475)	BP	GL6440	PI3KC2G (C-term)	BP
GL8360	NME4 (N-term)	BP	KM1650	PARK8 - mouse Mab	BP	GL6430	PI3KC2G (N-term)	BP
GL7280	NME5 (Center)	BP	KM1660	PARK8 - mouse Mab	BP	GL6460	PI3KC3 (C-term)	BP
GL7290	NME6 (N-term)	BP	KM8430	PARK8 Mutant G2019S	BP	GL6450	PI3KC3 (N-term)	BP
GL7310	NME7 (C-term)	BP	KM8450	PARK8 Mutant I2020T	BP	GL6480	PI3KCA (C-term)	BP
GL7300	NME7 (N-term)	BP	KM9340	PASK (N-term)	BP	GL6470	PI3KCA (N-term)	BP
GL8440	NPK (C-term)	BP	KM9360	PBK (C-term)	BP	GL6500	PI3KCB (C-term)	BP
GL8430	NPK (N-term)	BP	KM9350	PBK (N-term)	BP	GL6490	PI3KCB (N-term)	BP
GL7320	NRBP (N-term)	BP	GL7460	PBP (Center)	BP	GL6510	PI3KCD (C-term)	BP
KM9240	NRBP2 (N-term)	BP	GL7450	PBP (N-term)	BP	GL6530	PI3KCG (C-term)	BP
KM9250	NUAK2 (N-term)	BP	GL7480	PCK1 (C-term)	BP	GL6520	PI3KCG (N-term)	BP
GL7340	OPHN1L (Center)	BP	GL7470	PCK1 (N-term)	BP	S47340	PI3-KINASE P85ALPHA	SS
GL7330	OPHN1L (C-term)	BP	GL7500	PCK2 (C-term)	BP	GL6540	PI3KR1 (N-term)	BP
GR4150	P14ARF	BP	GL7490	PCK2 (N-term)	BP	GL6560	PI3KR2 (C-term)	BP
GR3360	P14ARF	BP	GL3860	PCTK1 (C-term)	BP	GL6550	PI3KR2 (N-term)	BP
HU6160	P14ARF - abs pack	BP	KM9370	PCTK1 (C-term)	BP	GL6570	PI3KR3 (C-term)	BP
GL3850	p38 (C-term)	BP	GL3870	PCTK2 (N-term)	BP	GL6590	PI3KR4 (C-term)	BP
GL3390	p38 (N-term)	BP	GL3880	PCTK3 (N-term)	BP	GL6580	PI3KR4 (N-term)	BP
KM9880	p38 beta (Center)	BP	BF1971	PDGFR ALPHA	SS	GL6640	PI4K II (N-term)	BP
GL3400	p38 beta (C-term K356)	BP	V13010	PDGFR ALPHA	SS	GL6660	PI4K II beta (C-term)	BP
KM9870	p38 beta (C-term)	BP	BF1961	PDGFR BETA	SS	GL6650	PI4K II beta (N-term)	BP
KM9890	p38 beta (N-term)	BP	KP1861	PDGFR BETA	SS	GL6610	PI4KCA (C-term)	BP
GL3410	p38 delta (C-term)	BP	KM9970	PDGFRA (Center)	BP	GL6600	PI4KCA (N-term)	BP
GL3420	p38 gamma (C-term)	BP	KM9980	PDGFRA (C-term D1033)	BP	GL6630	PI4KCB (C-term)	BP
KQ6410	p38 MAPK	BP	GL4550	PDGFRA (C-term E1063)	BP	GL6620	PI4KCB (N-term)	BP
KQ6470	p38 MAPK	BP	KM9960	PDGFRA (N-term)	BP	KN0100	PI5K (Center)	BP
KQ8720	p38 MAPK - abs pack	BP	GL4570	PDGFRB (C-term L1089)	BP	GL6670	PI5K (C-term K2016)	BP
GL2360	p70 S6K (C-term)	BP	GL4580	PDGFRB (C-term P1028)	BP	KN0090	PI5K (C-term Q1513)	BP
GR4750	p70 S6K	BP	GL4560	PDGFRB (N-term)	BP	KN0110	PI5K (N-term)	BP
GL6400	p70 S6Kbeta (C-term)	BP	GL4590	PDGFRL (C-term)	BP	GL5870	PIM1 (C-term)	BP
GL7360	PAC SIN1 (Center)	BP	KM9390	PDIK1L (C-term)	BP	GL5880	PIM2 (C-term)	BP
GL7350	PAC SIN1 (N-term)	BP	KM9380	PDIK1L (N-term)	BP	KM9450	PIM3 (C-term)	BP
GL7380	PAC SIN2 (Center)	BP	GL2370	PDK1 (N-term)	BP	GL6680	PIP5K1A (N-term)	BP
GL7370	PAC SIN2 (C-term)	BP	GL2380	PDK2 (C-term)	BP	GL6690	PIP5K1B (N-term)	BP
GL7400	PAC SIN3 (Center)	BP	GL2390	PDK3 (N-term)	BP	GL6710	PIP5K1G (C-term)	BP
GL7390	PAC SIN3 (N-term)	BP	GL2400	PDK4 (C-term)	BP	GL6700	PIP5K1G (N-term)	BP
GL5820	PAK1 (N-term)	BP	GL2420	PDPK1 (C-term)	BP	GL6730	PIP5K2A (C-term)	BP
GL5830	PAK2 (N-term)	BP	GL2410	PDPK1 (N-term)	BP	KM9470	PIP5K2A (N-term L122)	BP
GL5840	PAK3 (Center K218)	BP	KM9400	PDXK (C-term)	BP	GL6720	PIP5K2A (N-term)	BP
KN0070	PAK3 (Center)	BP	KM8020	PDXK (N-term)	BP	GL6750	PIP5K2B (C-term)	BP
KN0080	PAK3 (C-term)	BP	GL6920	PERK (C-term)	BP	GL6740	PIP5K2B (N-term)	BP
KN0060	PAK3 (N-term)	BP	GL8270	PFKFB1 (Center)	BP	GL6760	PIP5K2G (C-term)	BP
GR5870	PAK4	BP	GL8260	PFKFB1 (N-term)	BP	KM9460	PIP5K3 (Center)	BP
GL5850	PAK4 (N-term)	BP	GL8250	PFKFB2 (C-term)	BP	KM8260	PIP5K3 (C-term)	BP
BC4500	PAK5	BP	GL8240	PFKFB2 (N-term)	BP	KM9480	PIP5K3 (C-term)	BP
GL5860	PAK6	BP	GL8230	PFKFB3 (C-term)	BP	GL2120	PKA/C alpha/beta (N-term)	BP
KM9270	PANK1 (Center)	BP	GL8220	PFKFB3 (N-term)	BP	GL2130	PKA/C gamma (N-term)	BP
KM9260	PANK1 (N-term)	BP	GL8380	PFKFB4 (Center)	BP	S40510	PKC - mouse Mab	SS
KM9290	PANK2 (Center)	BP	KN0180	PFKL (Center K433)	BP	GL2140	PKC alpha (C-term)	BP
KM9280	PANK2 (N-term)	BP	GL8050	PFKL (Center)	BP	GL2150	PKC beta1/2 (C-term)	BP
KM9310	PANK3 (Center)	BP	KN0190	PFKL (C-term K760)	BP	GL2160	PKC beta2 (C-term)	BP
KM9300	PANK3 (N-term)	BP	GL8060	PFKL (C-term L684)	BP	GL2170	PKC delta (N-term)	BP
KM9330	PANK4 (C-term)	BP	GL8080	PFKM (C-term)	BP	GH5784	PKC epsilon	SS
KM9320	PANK4 (N-term)	BP	GL8070	PFKM (N-term)	BP	GL2180	PKC epsilon (N-term)	BP
GL7420	PAPSS1 (C-term)	BP	GL8040	PFKP (C-term)	BP	GL2190	PKC eta (N-term)	BP
GL7410	PAPSS1 (N-term)	BP	GL8030	PFKP (N-term)	BP	GL2200	PKC gamma (C-term)	BP
GL7440	PAPSS2 (C-term)	BP	KM7650	PFTK1 (C-term)	BP	GL2210	PKC iota (N-term)	BP
GL7430	PAPSS2 (N-term)	BP	GL3890	PFTK1 (N-term)	BP	GL2230	PKC mu (C-term)	BP
KM8400	PARK8 (C2354)	BP	KM9410	PFTK1 (N-term)	BP	GL2220	PKC mu (N-term)	BP
BX3470	PARK8 (Center)	BP	KM9420	PGK1 (Center S320)	BP	GL2250	PKC nu (C-term)	BP
KM8350	PARK8 (E285)	BP	KM8270	PGK1 (Center)	BP	GL2240	PKC nu	BP
KM8360	PARK8 (E519)	BP	KM9440	PGK2 (C-term)	BP	KP8000	PKC theta	BP
KM8410	PARK8 (K2402)	BP	KM9430	PGK2 (N-term)	BP	GL2260	PKC theta (C-term)	BP
KM8340	PARK8 (L229)	BP	GL2940	PHKG1 (Center)	BP	GL2270	PKC zeta (N-term)	BP
KM8370	PARK8 (L893)	BP	GL2960	PHKG2 (Center)	BP	GL5200	PKC-D2 (Center)	BP
KM8380	PARK8 (L899)	BP	GL2950	PHKG2 (N-term)	BP	GL5210	PKC-D2 (C-term)	BP
KM8390	PARK8 (L955)	BP	GL6410	PI3KC2A (N-term)	BP	GR3420	PKD2	BP

BP = blocking peptide available SS = small size available

Post-translational modifications

Phosphorylation



Anti-kinases antibodies (continued)

Cat #	Name		Cat #	Name		Cat #	Name	
GR5390	PKD2	BP	KM9540	PRKY (N-term)	BP	KM9810	SCYL1 (N-term)	BP
GL5890	PKD2 (C-term)	BP	KQ3050	PRMT1	BP	KM7640	SCYL2 (C-term)	BP
HU5440	PKD2 - abs pack	BP	KQ4670	PRMT1	BP	KM9840	SCYL3 (C-term)	BP
HP7310	PKD3	BP	KQ5540	PRMT1	BP	KM9830	SCYL3 (N-term)	BP
GL2440	PKLR (C-term)	BP	KQ1740	PRMT1 - abs pack	BP	KM9680	SEPSH1 (C-term)	BP
GL2430	PKLR (N-term)	BP	KQ4310	PRMT5	BP	KM9670	SEPSH1 (N-term)	BP
KM9490	PKM2 (C-term N491)	BP	KQ7680	PRMT5	BP	KM9700	SEPSH2 (Center)	BP
GL2450	PKM2 (C-term)	BP	KQ8110	PRMT5 - abs pack	BP	KM9690	SEPSH2 (N-term)	BP
CC8330	PKM2 (N-term)	BP	BG5010	PRP4 (C-term)	BP	GL2620	SGK (N-term)	BP
KM9500	PKMYT1 (Center)	BP	GL3900	PRP4 (N-term)	BP	GL6030	SGK2 (C-term)	BP
GL5930	PKN (C-term)	BP	GL7530	PRPK (Center)	BP	GL6020	SGK2 (N-term)	BP
GL5910	PKN (N-term)	BP	KM9550	PRPS1/2/3 (C-term)	BP	GL6050	SGK3 (Center)	BP
GL5900	PKN beta (C-term)	BP	KM7720	PRPS1/2/3 (N-term)	BP	GL6040	SGK3 (N-term)	BP
GL7510	PKR1 (N-term)	BP	KM9570	PSKH1 (C-term)	BP	KQ7230	SIN3A	BP
GL7520	PKR2 (N-term)	BP	KM9560	PSKH1 (N-term C3)	BP	KQ5130	SIN3A	BP
GL8510	PLAU (C-term)	BP	KM9580	PSKH1 (N-term H70)	BP	KQ8220	SIN3A	BP
GL8500	PLAU (N-term)	BP	KM9590	PSKH1 (N-term L9)	BP	KQ8290	SIN3A - abs pack	BP
GL8420	PLAUR (Center)	BP	GL2970	PSKH1 (N-term)	BP	GL4740	SKY (C-term)	BP
GL8410	PLAUR (C-term)	BP	GL2980	PSKH2 (Center)	BP	GL4730	SKY (N-term)	BP
KQ6450	PLK1	BP	GL5080	PTK6 (N-term)	BP	HP6300	SLK	BP
GR5990	PLK1	BP	GL5090	PTK7 (N-term)	BP	HP6720	SLK	BP
GR4810	PLK1	BP	KM9600	PTK9L (C-term)	BP	GL6060	SLK (N-term)	BP
GR5960	PLK1	BP	KM7630	PXK (Center)	BP	HP8510	SLK - abs pack	BP
GL5920	PLK1 (C-term)	BP	KM7620	PXK (N-term)	BP	KQ4620	SMG1	BP
HU5940	PLK1 - abs pack	BP	GL5450	RAF1 (N-term)	BP	BS1750	SMG1	BP
BH9200	PLK2 - abs pack	BP	KM9620	RBSK (C-term)	BP	BS1760	SMG1	BP
GL6770	PLK3 (C-term)	BP	KM9610	RBSK (N-term)	BP	GL6950	SMG1 (Center)	BP
BH9210	PLK3 - abs pack	BP	GL4630	RET (C-term L1027)	BP	KN0140	SMG1 (Central E2281)	BP
BH9220	PLK4 - abs pack	BP	GL4610	RET (C-term T1078)	BP	KN0130	SMG1 (C-term C3637)	BP
KM8250	PMVK (C-term)	BP	GL4600	RET (N-term C166)	BP	GL6940	SMG1 (C-term)	BP
KM9510	PMVK (C-term)	BP	GL4620	RET (N-term Q28)	BP	KN0120	SMG1 (N-term G14)	BP
KM8300	PNCK (C-term)	BP	KM9640	RFK (C-term)	BP	GL6930	SMG1 (N-term)	BP
KQ8520	PNK1	BP	KM9630	RFK (N-term)	BP	HU6320	SMG1 - abs pack	BP
KQ8780	PNK1	BP	GR4180	Rho kinase alpha	BP	HU5200	SMG5/EST1B	BP
GR3480	PNK1	BP	GR4920	Rho kinase alpha	BP	HU5210	SMG5/EST1B	BP
GR3470	PNK1	BP	HU5360	Rho kinase alpha	BP	HU6480	SMG5/EST1B - abs pack	BP
GR5660	PNK1	BP	BU6750	Rho kinase beta	BP	GL7550	SNF1LK (Center)	BP
HU5960	PNK1 - abs pack	BP	HP6820	Rho kinase beta	BP	GL7540	SNF1LK (C-term)	BP
KM9530	PPNK (C-term)	BP	BU6760	Rho kinase beta	BP	GL3170	SNK (C-term)	BP
KM9520	PPNK (N-term)	BP	HP7210	Rho kinase beta	BP	KM9860	SNRK (Center)	BP
GL5940	PRK2 (C-term)	BP	GL2640	RIOK1 (N-term)	BP	KM9850	SNRK (N-term)	BP
GL2460	PRKAB1 (N-term)	BP	KM7610	RIOK2 (Center)	BP	GL6250	SPAK (Center)	BP
GL2470	PRKAB2 (N-term)	BP	KM7600	RIOK2 (C-term)	BP	GL3000	SPHK1 (Center)	BP
GL2480	PRKACB (N-term)	BP	GL5460	RIPK1 (C-term)	BP	GL2990	SPHK1 (N-term)	BP
GL2490	PRKACB (N-term)	BP	GL5470	RIPK2 (C-term)	BP	GL3020	SPHK2 (C-term)	BP
GL2500	PRKAG1 (Center)	BP	KM9660	RIPK3 (Center)	BP	GL3010	SPHK2 (N-term)	BP
GL2510	PRKAG2 (N-term)	BP	GL5480	RIPK3 (C-term)	BP	GL5100	SRC (N-term)	BP
GL2520	PRKAG3 (Center)	BP	KM9650	RIPK3 (N-term)	BP	BM4770	SRC (N-term) - mouse Mab	BP
GL2530	PRKAR1B (N-term)	BP	KP8080	ROCKII		GL5120	SRMS (C-term)	BP
GL2540	PRKAR2B (N-term)	BP	GL4690	RON (Center)	BP	GL5110	SRMS (N-term)	BP
KM8010	PRKCABP (C-term)	BP	GL4680	RON (C-term)	BP	KN0020	SRPK1 (C-term)	BP
KM8000	PRKCABP (N-term)	BP	GL4670	RON (N-term)	BP	GL3910	SRPK1 (N-term)	BP
GL2570	PRKDC (Center)	BP	GL4640	ROR1 (N-term)	BP	KM7660	SRPK1 (N-term)	BP
GL2560	PRKDC (C-term)	BP	GL4660	ROR2 (C-term)	BP	GL3920	SRPK2 (C-term)	BP
GL2550	PRKDC (N-term)	BP	GL4650	ROR2 (N-term)	BP	GL3140	STK9 (Center)	BP
GL8340	PRKR (C-term)	BP	GL4700	ROS (N-term)	BP	GL3130	STK9 (C-term)	BP
GL8330	PRKR (N-term)	BP	KM9820	RPS6KL1 (N-term)	BP	GL3040	STK11 (C-term)	BP
KQ3790	PRKRIR	BP	GL5960	RSK1 (C-term)	BP	GL3030	STK11 (N-term)	BP
KQ5580	PRKRIR	BP	GL5980	RSK2 (C-term)	BP	GL3080	STK16 (C-term)	BP
KQ7370	PRKRIR	BP	GL5970	RSK2 (N-term)	BP	GL3070	STK16 (N-term)	BP
KQ7500	PRKRIR - abs pack	BP	GL5990	RSK3 (C-term)	BP	KM9720	STK19 (C-term)	BP
KN0260	PRKR-T535 (C-term)	BP	GL6000	RSK4 (N-term)	BP	KM9710	STK19 (N-term)	BP
KN0250	PRKR-Y27 (N-term)	BP	GL4720	RYK (C-term)	BP	KM9740	STK22B (C-term)	BP
GL2590	PRKWINK3 (C-term)	BP	GL4710	RYK (N-term)	BP	KM9730	STK22B (N-term)	BP
GL2580	PRKWINK3 (N-term)	BP	KQ7650	S6K2	BP	KM9750	STK29 (Center)	BP
GL2610	PRKWINK4 (Center)	BP	KQ5940	S6K2	BP	KM9760	STK29 (C-term)	BP
GL2600	PRKWINK4 (C-term)	BP	KQ4380	S6K2 - abs pack	BP	GL3100	STK31 (C-term)	BP
GL5950	PRKX (C-term)	BP	GL6010	SAK (C-term)	BP	GL3090	STK31 (N-term)	BP

BP = blocking peptide available SS = small size available

Anti-kinases antibodies (continued)

Cat #	Name	Cat #	Name	Cat #	Name
GL4750	STK33 (C-term)	BP	GL4800	TIE (N-term)	BP
GL3120	STK35 (Center)	BP	GL7570	TK (C-term)	BP
GL3110	STK35 (N-term)	BP	GL7560	TK (N-term)	BP
KM7920	STK38 (Center)	BP	BR6260	TK2 (C-term)	BP
KM7910	STK38 (C-term)	BP	BR6250	TK2 (N-term)	BP
KN0040	STK38L (C-term)	BP	GL7580	TLK1 (C-term)	BP
KN0030	STK38L (N-term)	BP	GL7590	TLK2 (Center)	BP
KN0050	STYK1 (N-term)	BP	GL6280	TNIK (C-term)	BP
KQ4110	SYK	BP	GL6270	TNIK (N-term)	BP
KQ3720	SYK	BP	GL5150	TNK1 (Center)	BP
GL5130	SYK (C-term)	BP	KN0010	TRIB1 (C-term)	BP
KQ8280	SYK - abs pack	BP	GL4810	TRKA (C-term)	BP
GL6070	TAK1 (C-term)	BP	GL4820	TRKB (C-term)	BP
BH9230	TAK1 - abs pack	BP	GL4830	TRKC (N-term)	BP
GL6080	TAO (C-term)	BP	GL6970	TRRAP (Center)	BP
GL6260	TAO1 (Center)	BP	GL6960	TRRAP (C-term)	BP
GL4760	TAO2 (C-term)	BP	GL3150	TSSK1 (Center)	BP
HP6980	TAOK1	BP	GL3160	TSSK3 (N-term)	BP
KM8130	TAOK1 (Center)	BP	GR5530	TTK	BP
GL5140	TEC (Center)	BP	GR3770	TTK	BP
GL4780	TEK (C-term)	BP	GL7600	TTK (N-term)	BP
GL4790	TEK (N-term)	BP	HU6060	TTK - abs pack	BP
GL5490	TESK1 (C-term)	BP	GL5160	TXK (N-term)	BP
GL5500	TESK2 (Center)	BP	GL5180	TYK2 (C-term)	BP
GR4440	TFII-I	BP	GL5170	TYK2 (N-term)	BP
GR5170	TFII-I	BP	GL4840	TYRO10	BP
HU5280	TFII-I - abs pack	BP	GL4770	TYRO10 (C-term)	BP
GL5510	TGFBF1 (Center)	BP	GR5180	TYRO3	BP
GL7940	UCK (C-term)	BP	GL7930	UCK (N-term)	BP
KM9780	UCK2 (C-term)	BP	KM9770	UCK2 (N-term)	BP
GL7610	ULK1 (C-term)	BP	GL7620	ULK2 (C-term)	BP
GL7620	ULK2 (C-term)	BP	KM9800	URKL1 (C-term)	BP
GL7650	WNK1 (Center)	BP	KM9790	URKL1 (N-term)	BP
GL7630	WEE1 (C-term)	BP	GL3270	VRK1 (Center)	BP
GL7660	WNK1 (Center)	BP	GL3280	VRK2 (N-term)	BP
GL7650	WNK1 (C-term)	BP	GL3290	VRK3 (Center)	BP
GL2630	YANK2 (C-term)	BP	GL7640	WEE1 (Center)	BP
GL5190	YES (N-term)	BP	GL7630	WEE1 (C-term)	BP
GL6100	YSK (C-term)	BP	GL7660	WNK1 (Center)	BP
YL8400	YWHAB (C-term)	BP	GL7650	WNK1 (C-term)	BP
GL8390	YWHAB (N-term)	BP	GL2630	YANK2 (C-term)	BP
GL5520	ZAK (C-term)	BP	GL5190	YES (N-term)	BP
GL5530	ZAP70 (Center)	BP	GL6100	YSK (C-term)	BP
KP8690	ZAP70 (aa 1-254)	SS	YL8400	YWHAB (C-term)	BP
GH4391	ZAP70 (aa 1-254) - mouse Mab	SS	GL8390	YWHAB (N-term)	BP
GL5400	ZPK (Center)	BP	GL5520	ZAK (C-term)	BP
GL2760	ZPK (C-term)	BP	GL5530	ZAP70 (Center)	BP

BP : Blocking Peptide available / SS : Small size available

Anti-phosphatases antibodies

These antibodies are rabbit polyclonals except when other host is specified.

Cat #	Name	Cat #	Name	Cat #	Name
HP7020	ALPHA 4	BP	KN0750	DUSP6 (Center)	BP
HP7180	ALPHA 4	BP	KN0770	DUSP7 (C-term)	BP
HP8090	ALPHA 4 - abs pack	BP	KN0760	DUSP7 (N-term)	BP
Q06020	AP (Alkaline phosphatase)	SS	KN0790	DUSP8 (C-term)	BP
CG4900	ASPP1	BP	KN0780	DUSP8 (N-term)	BP
CG4901	ASPP1	BP	KN0810	DUSP9 (C-term)	BP
CG4910	ASPP1 - abs pack	BP	KN0800	DUSP9 (N-term)	BP
GL8590	BDP1 (N-term)	BP	KN0830	DUSP10 (C-term)	BP
KN0660	CDC14	BP	KN0820	DUSP10 (N-term)	BP
V09410	CDC14A - mouse Mab	SS	KN0850	DUSP12 (C-term)	BP
KM4500	CDC25A (phospho S123)	BP	KN0840	DUSP12 (N-term)	BP
KM4510	CDC25A (phospho S177)	BP	KN0870	DUSP13-L184 (C-term)	BP
KM4520	CDC25A (phospho S278)	BP	KN0860	DUSP13-M1 (N-term)	BP
KM4530	CDC25A (phospho S292)	BP	KN0890	DUSP14 (C-term)	BP
KM4540	CDC25A (phospho S75)	BP	KN0880	DUSP14 (N-term)	BP
KM4550	CDC25A (phospho T506)	BP	KN0910	DUSP15 (C-term)	BP
KM4560	CDC25B (phospho S186)	BP	KN0900	DUSP15 (N-term)	BP
KM4570	CDC25B (phospho S187)	BP	KN0930	DUSP16 (C-term)	BP
KM4580	CDC25B (phospho S353)	BP	KN0920	DUSP16 (N-term)	BP
KN0980	CTDSP1-V250 (C-term)	BP	KP1121	FAP-1	SS
KN0970	CTDSP2 (C-term)	BP	GL8610	GLEPP1 (Center)	BP
KN0960	CTDSP2 (N-term)	BP	KN0680	HePTP	BP
GL8600	DEP1 (C-term)	BP	KQ1240	INPPL1 (SHIP2)	BP
KN1150	DUSP1 (C-term)	BP	GL8620	LAR (C-term)	BP
KN1140	DUSP1 (N-term)	BP	KN0670	LMW-PTP	BP
KN0690	DUSP3	BP	GL8640	LyPTP (C-term)	BP
KN0710	DUSP3 (C-term)	BP	GL8630	LyPTP (N-term)	BP
KN1310	DUSP3 (N-term)	BP	GL8650	MEG1 (Center)	BP
KN0720	DUSP4 (Center)	BP	GL8670	MEG2 (C-term)	BP
KN0730	DUSP4 (C-term)	BP	GL8660	MEG2 (N-term)	BP
BY9300	DUSP5 (C-term)	BP	KN0700	MKP3	BP
KN0740	DUSP5 (N-term)	BP	GL1940	MTM1 (C-term)	BP
GL1930	MTM1 (N-term)	BP	GL1850	MTMR1 (N-term)	BP
GL1850	MTMR1 (N-term)	BP	GL1860	MTMR2 (N-term)	BP
GL1860	MTMR2 (N-term)	BP	GL1870	MTMR3 (C-term)	BP
GL1870	MTMR3 (C-term)	BP	GL1880	MTMR4 (C-term)	BP
GL1880	MTMR4 (C-term)	BP	GL1890	MTMR5 (C-term)	BP
GL1890	MTMR5 (C-term)	BP	GL1900	MTMR6 (C-term)	BP
GL1900	MTMR6 (C-term)	BP	GL1910	MTMR7 (C-term)	BP
GL1910	MTMR7 (C-term)	BP	GL1920	MTMR8 (C-term)	BP
GL1920	MTMR8 (C-term)	BP	KQ0821	MYPT1	BP
KQ0821	MYPT1	BP	KQ0820	MYPT1	BP
KQ0820	MYPT1	BP	KQ0750	MYPT1 - abs pack	BP
KQ0750	MYPT1 - abs pack	BP	GL8680	PCPTP1 (N-term)	BP
GL8680	PCPTP1 (N-term)	BP	KQ4290	PHLPP	BP
KQ4290	PHLPP	BP	KQ5980	PHLPP	BP
KQ5980	PHLPP	BP	KQ2670	PHLPP/PHLPL - abs pack	BP
KQ2670	PHLPP/PHLPL - abs pack	BP	KQ1820	PHLPL	BP
KQ1820	PHLPL	BP	N81840	PLAP - mouse Mab	SS
N81840	PLAP - mouse Mab	SS	V17500	PLAP - rabbit Mab	SS
V17500	PLAP - rabbit Mab	SS	GR3470	PNK1	BP
GR3470	PNK1	BP	GR5660	PNK1	BP
GR5660	PNK1	BP	GR3480	PNK1	BP
GR3480	PNK1	BP	HU5960	PNK1 - abs pack	BP
HU5960	PNK1 - abs pack	BP	KQ8520	PNK1 for IHC	BP
KQ8520	PNK1 for IHC	BP	KQ8780	PNK1 for IHC	BP
KQ8780	PNK1 for IHC	BP	HU5170	PNUTS	BP
HU5170	PNUTS	BP	HU5180	PNUTS	BP
HU5180	PNUTS	BP	HU5190	PNUTS	BP
HU5190	PNUTS	BP	HU6470	PNUTS - abs pack	BP
HU6470	PNUTS - abs pack	BP	KQ5630	PNUTS for IHC	BP
KQ5630	PNUTS for IHC	BP	KQ6160	PP2A	BP
KQ6160	PP2A	BP	KQ6390	PP2A	BP
KQ6390	PP2A	BP			

BP = blocking peptide available SS = small size available

Antibodies against phosphorylated proteins

These antibodies are rabbit polyclonals except when other host is specified

Cat #	Name		Cat #	Name		Cat #	Name	
KM4210	14-3-3 protein (pS58)	BP	CF9790	Bad (mouse pS136)	BP	MB9460	CDC25A (pS75)	NP
KM4220	14-3-3 protein (pT232)	BP	CF9800	Bad (mouse pS155)	BP	KM4550	CDC25A (pT506)	BP
MB9780	14-3-3 zeta protein (pS58)	NP	GK2310	Bad (mouse pS155) - Mouse Mab	BP	KM4560	CDC25B (pS186)	BP
MC0020	4E-BP1 (pT36)	NP	MB8870	Bad (pS112)	NP	KM4570	CDC25B (pS187)	BP
MC0030	4E-BP1 (pT45)	NP	BY9190	Bad (pS118)	BP	KM4580	CDC25B (pS353)	BP
KQ5260	53BP1 (pS25)	BP	JW3070	Bad (pS128)		MB9290	CDC25C (pS216)	NP
KM4270	ABL (pS588)	BP	KM4420	Bad (pS134)	BP	JW3140	CDC27 (pT244)	
KM4280	ABL1 (pY134)	BP	JW3060	Bad (pS136)		KM4600	CDC6 (pS54)	BP
KM4290	ABL1 (pY245)	BP	MB8880	Bad (pS155)	NP	KM4610	CDK1 (pS39)	BP
KM4300	ABL1 (pY251)	BP	KM4430	Bad (pS75)	BP	KM4620	CDK2 (pT160)	BP
KM4310	ABL1 (pY272)	BP	KM4440	Bad (pS99)	BP	KM4630	CDK2 (pT160)	BP
KM4320	ABL1 (pY276)	BP	MB8850	BCL-2 (pS70)	NP	MB9420	CDK2 (pT160)	NP
MB9790	ADD1 (pS726)	NP	MB8840	BCL-2 (pT56)	NP	KM4640	CDK7 (pT170)	BP
MB9450	AFX (pS197)	NP	JW2731	Bcl-xL (pS62)		JW3150	c-Fos (pT232)	
MB8740	AKT (pS473)	NP	MB8860	BCL-XL (pS62)	NP	JW3160	c-Fos (pT325)	
JW2580	AKT (pS473) - Rabbit Mab		MB9890	Bcr (pY177)	NP	KM4650	Chk1 (pS280)	BP
MB8750	AKT (pT308)	NP	KM4450	Bid (mouse pS61)	BP	KM4660	Chk1 (pS317)	BP
KM4360	AKT (pY326)	BP	HP6590	Bid (pS61)	BP	MB9300	Chk1 (pS345)	NP
KM4340	AKT1 (pS124)	BP	KM4460	Bid (pS65)	BP	MB9530	Chk2 (pS156)	NP
KM4350	AKT1 (pS129)	BP	HP6430	Bid (pS78)	BP	MB8810	Chk2 (pT68)	NP
T95950	AKT1 (pS472) (rat)		KM4470	Bik (pT33)	BP	MB8470	c-Jun (pS243)	NP
BY4510	AKT1 (pS473)		MC0480	BIM (pS69/65)	NP	KM4670	c-Jun (pS63)	BP
KP6930	AKT1 (pT308)		JW3080	BLNK (pY84)		KM4680	c-Jun (pS63)	BP
BY9170	AKT1 (pY326)	BP	AK9870	BRCA1 (pS1189)	BP	MB8240	c-Jun (pS63)	NP
MB9330	AKT2 (pS474)	NP	AK9880	BRCA1 (pS1280)	BP	CF9810	c-Jun (pS73)	BP
MB9800	AMPK1 (pT174)	NP	AK9900	BRCA1 (pS1387)	BP	KM4690	c-Jun (pS73)	BP
MB9720	AMPK1/AMPK2 (pS485/S491)	NP	AK9910	BRCA1 (pS1423)	BP	MB8260	c-Jun (pS73)	NP
KM4370	APBB1 (pS175)	BP	AK9920	BRCA1 (pS1457)	BP	MB8460	c-Jun (pT239)	NP
KM4380	APBB1 (pS347)	BP	AK9940	BRCA1 (pS1466)	BP	MB8430	c-Jun (pT91)	NP
JW2980	Apc1 (pS377)		MB9280	BRCA1 (pS1524)	NP	JW2610	c-Jun (pT91) - Mouse Mab	
JW2990	Apc6 (pT580)		AK9860	BRCA1 (pS1524)	BP	MB8440	c-Jun (pT93)	NP
BY9180	APP (pS198)	BP	MC0170	BRCA1 (pS1423)	NP	MB8450	c-Jun (pY170)	NP
KM4390	APP (pS730)	BP	JW3090	c-Abl (pY245)		JW3180	c-Kit (pY568/Y570)	
JW2970	APP (pT668)		MB9340	c-Abl (pY412)	NP	JW3190	c-Kit (pY703)	
KM4400	APP (pY756)	BP	AW7660	CaMKII (pT286)		MC0160	c-Kit (pY721)	NP
MB9840	APP (phospho-668)	NP	MC0470	CaMKII (pT286)	NP	JW3220	c-Kit (pY730)	
JW3000	Arrestin beta 1 (pS412)		AW9850	CaMKII (pT305)		JW3230	c-Kit (pY823)	
IS6720	ASK1 (pS83)		JW3110	CaMKII alpha (pT286)		JW3210	c-Kit (pY936)	
MB9760	ASK1 (pS83)	NP	JW2600	CaMKII alpha (pT286) - Mouse Mab			c-MET, see MET	
MB9770	ASK1 (pS966)	NP	JW3120	Casein Kinase 2 beta (pS209)		KP7660	c-Myc (pS373)	
MB8550	ATF2 (pS112 or 94)	NP	KM4480	Caspase 6 (pS257)	BP	KP7680	c-Myc (pS58)	
KP6970	ATF2 (pS44)		KM4490	Caspase 9 (pS196)	BP	JW2620	c-Myc (pS62) - Mouse Mab	
MB8510	ATF2 (pS62 or 44)	NP	MC0690	Catenin-alpha (pS641)	NP	KP7670	c-Myc (pT358)	
KP6980	ATF2 (pS94)		MB9980	Catenin-beta (pS33)	NP	JW3240	c-Myc (pT58/S62)	
KP6990	ATF2 (pT51)		JW2570	Catenin-beta (pS33) - Mouse Mab		MB9470	cofilin (pS3)	NP
KP7000	ATF2 (pT53)		JW3130	Catenin-beta (pS33/37)		MC0290	Connexin 43 (pS367)	NP
KP7010	ATF2 (pT55)		MB9990	Catenin-beta (pS37)	NP	JW3260	Connexin 43 (pS368)	
MB8520	ATF2 (pT69 or 51)	NP	MB9270	Catenin-beta (pT41/S45)	NP	JW3270	Cortactin (pY421)	
JW3010	ATF2 (pT69/71)		IS7300	Catenin-beta (pY654) - Mouse Mab		MC0380	Cortactin (pY466)	NP
MB8530	ATF2 (pT71 or 53)	NP	IS7230	Catenin-beta (pY86) - Mouse Mab		CF9820	cPLA2 (pS505)	BP
JW3020	ATF2 (pT71)		MB9090	Caveolin-1 (pY14)	NP	JW3290	c-Raf (pS259)	
MB8540	ATF2 (pT73 or 55)	NP	KM4710	CCNB1 (pS126)	BP	JW3320	c-Raf (pS43)	
KP6960	ATF4 (pS245)		KM4590	CDC2 (pT161)	BP	JW3310	c-Raf (pS621)	
MB8730	ATF4 (pS245)	NP	MB9430	CDC2 (pT161)	NP	JW3330	c-Raf (pY340/341)	
MB9310	ATM (pS1981)	NP	MC0180	CDC2 (pY15)	NP	GP7660	CREB (pS121)	
JW2590	ATM (pS1981) - Mouse Mab		KM4500	CDC25A (pS123)	BP	MC0390	CREB (pS129)	NP
CF9770	Aurora A (pT288)	BP	KM4510	CDC25A (pS177)	BP	JW3340	CREB (pS129/133)	
CF1191	Aurora-A (pT288) for IHC		KM4520	CDC25A (pS278)	BP	KM4700	CREB (pS133)	BP
KM4410	BACE (pS498)	BP	KM4530	CDC25A (pS292)	BP	MB8720	CREB (pS133)	NP
CF9780	Bad (mouse pS112)	BP	KM4540	CDC25A (pS75)	BP	KP7280	c-Rel (pS503)	

NP : means non-phosphospecific match-paired antibody is available
BP : means Blocking Peptide is available

Functional Proteomics

Phosphorylation



Antibodies against phosphorylated proteins (continued)

Cat #	Name	Cat #	Name	Cat #	Name
JW3350	c-Ret (pS696)	CF9830	Estrogen Receptor alpha (pS104/106) <i>BP</i>	KM4920	HIST1H3B3 (pS10) <i>BP</i>
IS6400	Cyclin B1 (pS126)	MB8900	Estrogen Receptor alpha (pS106) <i>NP</i>	MC0360	Histone H2A.X (pS139) <i>NP</i>
KM4720	Cyclin E1 (pT395) <i>BP</i>	MB8910	Estrogen Receptor alpha (pS118) <i>NP</i>	KM4230	Histone H3 (pS10) <i>BP</i>
JW3360	Dab1 (pS491)	MB8920	Estrogen Receptor alpha (pS167) <i>NP</i>	KM4240	Histone H3 (pS10) <i>BP</i>
JW3370	Dab1 (pY198)	JW3660	ETS1 (pS251)	GK2400	Histone H3 (pS10) - Mouse Mab <i>BP</i>
JW3380	Dab1 (pY220)	JW3670	ETS1 (pS282)	GK2410	Histone H3 (pS10) - Mouse Mab <i>BP</i>
GP7530	DARPP32 (pT34)	JW3680	ETS1 (pS282/285)	GK2420	Histone H3 (pS10) - Mouse Mab <i>BP</i>
GP7390	DARPP32 (pT75)	JW3690	ETS1 (pT38)	KM4250	Histone H3 (pS28) <i>BP</i>
KM4730	DAXX (pS213) <i>BP</i>	HP6690	EZH2 (pS21) <i>BP</i>	KM4260	Histone H3 (pS28) <i>BP</i>
KM4740	DAXX (pS495) <i>BP</i>	MB9910	Ezrin (pT566) <i>NP</i>	JW2680	Histone H3 (pS28) - Rat Mab
KM4750	DAXX (pS517) <i>BP</i>	MB8830	Ezrin (pY353) <i>NP</i>	MB9810	Histone H3.1 (pS10) <i>NP</i>
MB9690	DNA PKcs (pT2609) <i>NP</i>	KM4840	FADD (mouse pS191) <i>BP</i>	MC0320	HSF1 (pS303) <i>NP</i>
JW2630	DNA PKcs (pT2609) - Mouse Mab	JW3700	FAK (pS722)	JW3910	HSP25 (pS86) <i>NP</i>
JW3410	DOK2 (pY142)	JW3770	FAK (pS732)	MB9670	HSP27 (pS15) <i>NP</i>
AW9830	Dynamin (pS774)	JW3780	FAK (pS843)	MC0210	HSP27 (pS78) <i>NP</i>
AW9840	Dynamin (pS778)	JW3710	FAK (pS910)	MC0220	HSP27 (pS82) <i>NP</i>
GR5980	E2A (pT355) <i>BP</i>	JW3720	FAK (pY397)	MB9870	HSP90B (pS254) <i>NP</i>
KM4760	E2F1 (pS337) <i>BP</i>	JW2640	FAK (pY397) - Rabbit Mab	MB9020	ICAM-1 (pY512) <i>NP</i>
IS7410	EGFR (pS1047) - Mouse Mab	JW3730	FAK (pY407)	JW3930	IFNAR1 (phospho S535/539)
MB8990	EGFR (pS1070) <i>NP</i>	JW3740	FAK (pY576)	MB9060	IGF-1R (pY1161) <i>NP</i>
IS7280	EGFR (pT654) - Mouse Mab	JW3750	FAK (pY577)	MB9070	IGF-1R (pY1165/Y1166) <i>NP</i>
MB9820	EGFR (pT678) <i>NP</i>	MB8790	FAK (pY861) <i>NP</i>	IGF1R, see Insulin Receptor	
MB9830	EGFR (pT693) <i>NP</i>	MB9320	FAK (pY925) <i>NP</i>	JW3940	IKB alpha (pS32/36)
JW3480	EGFR (pY1016)	JW3790	Fanconi anemia D2 (pS222)	MB9570	IKB alpha (pS32/S36) <i>NP</i>
IS7180	EGFR (pY1045) - Mouse Mab	CE7570	FGFR (pY653/654) <i>BP</i>	MB9650	IKB alpha (pY42) <i>NP</i>
JW3420	EGFR (pY1068)	KM4850	FGFR (pY766) <i>BP</i>	MC0570	IKB beta (pS23) <i>NP</i>
JW3430	EGFR (pY1086)	MB9260	FKHR (pS256) <i>NP</i>	MB9940	IKB epsilon (pS22) <i>NP</i>
MB9000	EGFR (pY1092) <i>NP</i>	MB9440	FKHR (pS319) <i>NP</i>	JW3950	IKK alpha (pS176/S180)
MC0330	EGFR (pY1110) <i>NP</i>	MB9600	FKHRL1 (pS253) <i>NP</i>	MB9380	IKK alpha (pT23) <i>NP</i>
JW3440	EGFR (pY1148)	MB9010	G3BP-1 (pS232) <i>NP</i>	KM4960	IKKb (pY199) <i>BP</i>
MC0000	EGFR (pY1172) <i>NP</i>	KM4880	Gab1 (pY627) <i>BP</i>	KM4980	IKKg (mouse pS375) <i>BP</i>
JW3450	EGFR (pY1173)	MC0500	Gab1 (pY627) <i>NP</i>	KM4970	IKKg (pS31) <i>BP</i>
MC0070	EGFR (pY1197) <i>NP</i>	AW7700	GAP43 (pS41) <i>NP</i>	KM4990	IKKg (pS43) <i>BP</i>
JW3460	EGFR (pY845)	MB8620	GATA1 (pS142) <i>NP</i>	KM5000	IL1R (pY496) <i>BP</i>
IS7640	EGFR (pY845) - Mouse Mab	MB8630	GATA1 (pS310) <i>NP</i>	KM5010	IL3R (pY593) <i>BP</i>
MC0080	EGFR (pY869) <i>NP</i>	JW3810	GATA4 (pS105)	BY9200	IL3R (pY766) <i>BP</i>
JW3470	EGFR (pY992)	MC0310	GluR1 (pS849) <i>NP</i>	KM5020	INSR (pY1361) <i>BP</i>
MC0430	eIF2A (pS51) <i>NP</i>	MC0510	Glutamate receptor 2 (Prec.) (pS880) <i>NP</i>	JW3970	Insulin Receptor (pY1158)
JW3490	eIF2A (pS52)	JW3820	Glycogen Synthase (pS640)	JW3980	Insulin Receptor (pY1158/1162/1163)
JW3500	eIF2B epsilon (pS539)	JW3890	Glycogen Synthase (pS641/645)	KP7490	Insulin Receptor (pY1161)
MC0120	eIF4E (pS209) <i>NP</i>	JW3840	GRK2 (pS670)	JW3990	Insulin Receptor (pY1162/1163)
JW3520	eIF4G (pS1108)	MB8300	GSK3 alpha (pS21) <i>NP</i>	JW3960	Insulin Receptor (pY972)
JW3530	Elk (pS383)	JW3850	GSK3 alpha + beta (pY216/Y279)	JW4000	Integrin alpha 4 (pS988)
BC4150	Elk1 (pS383)	KM4900	GSK3 beta (pS21/29) <i>BP</i>	JW4200	Integrin beta 1 (pS785)
MB8270	Elk1 (pS383) <i>NP</i>	KM4910	GSK3 beta (pS9) <i>BP</i>	JW4010	Integrin beta 1 (pT788/T789)
MB8590	Elk1 (pS389) <i>NP</i>	MB8250	GSK3 beta (pS9) <i>NP</i>	MB8800	Integrin beta 3 (pY773) <i>NP</i>
MB8600	Elk1 (pT417) <i>NP</i>	MC0560	GSK3 beta (pY216) <i>NP</i>	MC0450	Integrin beta 3 (pY785) <i>NP</i>
JW3540	eNOS (pS116)	AZ3810	H2AX gamma (pS139) <i>BP</i>	CF9870	Integrin beta 4 (pY1422) <i>BP</i>
AL8590	eNOS (pS1177) - Mouse Mab	JW3900	Hck (pY207/S211)	CF9880	Integrin beta 4 (pY1440) <i>BP</i>
JW3550	EphrinB (pY298)	MB9850	HDAC4 (pS632) <i>NP</i>	CF9890	Integrin beta 4 (pY1526) <i>BP</i>
JW3560	EphrinB (pY317)	MB9860	HDAC5 (pS498) <i>NP</i>	CF9900	Integrin beta 4 (pY1642) <i>BP</i>
JW3570	EphrinB (pY331)	MB9370	HDAC8 (pS39) <i>NP</i>	BY9210	IRAK1 (pS376) <i>BP</i>
KM4770	ErbB2 (pY1112) <i>BP</i>	HP6910	HdmX / MDM (pS403) <i>BP</i>	JW4050	IRE1 alpha (pS724)
JW3590	ErbB2 (pY1248)	KM4930	HER2 (pY1112) <i>BP</i>	MC0140	IRS1 (pS307) <i>NP</i>
KM4780	ErbB2 (pY1248) <i>BP</i>	KP7140	HER2 (pY1221)	MB9490	IRS1 (pS312) <i>NP</i>
KM4790	ErbB2 (pY871) <i>BP</i>	MB8950	HER2 (pY1221/Y1222) <i>NP</i>	JW4060	IRS1 (pS616)
JW3610	ERK1/2 (pT185/T202) (FITC)	KP7160	HER2 (pY1222)	MC0100	IRS1 (pS636) <i>NP</i>
JW3620	ERK1/2 (pT202/183 + Y204/185)	MB8980	HER2 (pY1248) <i>NP</i>	MC0090	IRS1 (pS639) <i>NP</i>
KM4800	ERK3 (pS189) <i>BP</i>	N67020	HER2 (pY1248) - Mouse Mab	JW4070	IRS1 (pY1179)
JW3630	ERK5 (pT218)	MB8940	HER2 (pY877) <i>NP</i>	JW4080	IRS1 (pY1229)
KM4810	ESPL1 (pS1176) <i>BP</i>	N67020	HER-2 (phospho) - Mouse Mab	JW4110	IRS1 (pY612)
KM4820	ESPL1 (pS748) <i>BP</i>	KM4940	HER4 (pY1162) <i>BP</i>	JW4090	IRS1 (pY896)
KM4830	ESPL1 (pS801) <i>BP</i>	KM4950	HER4 (pY1188) <i>BP</i>	JW4120	IRS1 (pY941)
KQ8190	Estrogen Receptor alpha (pS305) <i>BP</i>	CF9840	HGFR (pY1230) <i>BP</i>	JW4130	IRS2 (pS731)
MB8890	Estrogen Receptor alpha (pS104) <i>NP</i>	CF9850	HGFR (pY1234/5) <i>BP</i>	MB9540	JAK1 (pY1022) <i>NP</i>

NP = means non-phosphospecific match-paired antibody is available
BP = means Blocking Peptide is available

Antibodies against phosphorylated proteins (continued)

Cat #	Name	Cat #	Name	Cat #	Name
JW4140	JAK1 (pY1022/1023)	JW4340	MEK4 (pS257/T261)	BU2610	n-Myc (pS54)
MB9560	JAK2 (pY1007) <i>NP</i>	KM5100	MEK4 (pT261) <i>BP</i>	KM5220	Nudel (pS231) <i>BP</i>
JW4150	JAK2 (pY1007/1008)	CF5050	MEK5 / MAPKK5 (pS311/T315)	KM5230	Nudel (pS242) <i>BP</i>
MB9550	JAK2 (pY221) <i>NP</i>	KM5110	MEK6 (pS202) <i>BP</i>	KM5240	Nudel (pT219) <i>BP</i>
JW4160	JNK1+JNK2 (pT183/Y185)	JW4350	MEK7 (pS271/T275)	KM5250	Nudel (pT245) <i>BP</i>
MB8490	JunB (pS259) <i>NP</i>	MC0340	Merlin (pS518) <i>NP</i>	JW4460	N-WASP (pY256)
MB8480	JunB (pS79) <i>NP</i>	JW4360	MERTK (pY749/753/754)	D14800	OBRb (mouse pY1138)
MB8500	JunD (pS255) <i>NP</i>	JW4370	MET (pY1230/1234/1235)	H24820	OBRb (mouse pY985)
KQ4830	KAP-1 (pS824) <i>BP</i>	JW4400	MET (pY1365)	KM5260	p16-INK4A (pS140) <i>BP</i>
CF9910	KDR (pY1175) <i>BP</i>	KM5120	MET (pY1003) <i>BP</i>	KM5270	p16-INK4A (pS152) <i>BP</i>
KP7400	KDR/FLK1 (pY1214)	MC0060	MET (pY1234) <i>NP</i>	KM5280	p16-INK4A (pS7) <i>BP</i>
KM4860	KDR/FLK1 (pY951) <i>BP</i>	KM5130	MET (pY1349) <i>BP</i>	KM5290	p16-INK4A (pS8) <i>BP</i>
KM4870	KDR/FLK1 (pY996) <i>BP</i>	KM5140	MET (pY1349) <i>BP</i>	KM5300	P21CIP1 (pS146) <i>BP</i>
MC0580	Keratin 18 (pS33) <i>NP</i>	KM5150	MET (pY1349) <i>BP</i>	KM5310	P21CIP1 (pT145) <i>BP</i>
U99050	Keratin 18 (pS33) - Mouse Mab	MC0150	MET (pY1349) <i>NP</i>	KM5320	P21CIP1 (pT57) <i>BP</i>
U98860	Keratin 8 (pS431) - Mouse Mab	KM5160	MET (pY1356) <i>BP</i>	KM5330	p27Kip1 (pS10) <i>BP</i>
U98980	Keratin 8 (pS73) - Mouse Mab	GK2200	MET/HGFR (phospho) - Mouse Mab <i>BP</i>	KM5340	p27Kip1 (pS178) <i>BP</i>
CF9920	LAT (pY132) <i>BP</i>	KM5170	MKK3 (pS189) <i>BP</i>	KM5350	p27Kip1 (pT157) <i>BP</i>
CF9930	LAT (pY171) <i>BP</i>	MB9510	MKK3 (pS189) <i>NP</i>	KM5360	p27Kip1 (pT187) <i>BP</i>
JW4170	LAT (pY191)	MB9520	MKK6 (pS207) <i>NP</i>	MB9930	p27Kip1 (pT187) <i>NP</i>
JW4200	Lck (pS158)	JW5380	MLCK smooth muscle (pS1760)	JW4520	p38 (pY182/T180)
JW4210	Lck (pY192)	GL8580	Mlrf1 (phospho) <i>BP</i>	MC0250	P38 MAPK (pT180) <i>NP</i>
MB9500	Lck (pY393) <i>NP</i>	JW4410	MLK3 (phosphoT277/S281)	MC0260	P38 MAPK (pY182) <i>NP</i>
JW4190	Lck (pY505)	KM5180	MSK (pS360) <i>BP</i>	AW7740	p38MAPK (pT180/Y182)
JW4220	LIMK 1/2 (pT507/Y508)	MC0010	mTOR (pS2448) <i>NP</i>	MC0200	p44/42 MAP Kinase (pY204) <i>NP</i>
MB9350	LIMK1 (pT508) <i>NP</i>	JW4430	Munc-18 (pS515)	MC0190	p44/42 MAP Kinase:pT202) <i>NP</i>
MB9360	LIMK2 (pT505) <i>NP</i>	MB8580	Myc (pS373) <i>NP</i>	MB9110	p53 (pS15) <i>NP</i>
JW4230	Lipoxygenase (pS523)	MB8570	Myc (pT358) <i>NP</i>	KM5370	p53 (pS20) <i>BP</i>
KM3770	LLGL1/2 (pS650/654) <i>BP</i>	MB8560	Myc (pT58) <i>NP</i>	KM5380	p53 (pS315) <i>BP</i>
KM5030	LPR1 (pS452) <i>BP</i>	MB8960	MyoD (pS200) <i>NP</i>	MB9140	p53 (pS315) <i>NP</i>
KM5040	MAPKAPK1 (pS364) <i>BP</i>	JW4450	Myosin light chain (pS19)	KM5390	P53 (pS33) <i>BP</i>
KM5050	MAPKAPK2 (pS272) <i>BP</i>	JW4440	Myosin light chain (pS20)	KP7920	p53 (pS33) <i>BP</i>
MC0590	MAPKAPK2 (pT334) <i>NP</i>	KM5190	MYT1 (pT495) <i>BP</i>	KM5400	p53 (pS37) <i>BP</i>
JW4240	MAPKAPK2 (pT334)	GR4700	NBS1 (human pS343) <i>BP</i>	KM5410	p53 (pS376) <i>BP</i>
KM5060	MAPKAPK5 (pS212) <i>BP</i>	GR5780	NBS1 (mouse pS343) <i>BP</i>	KM5420	p53 (pS378) <i>BP</i>
CF9950	MAPKAPK5 (pS93) <i>BP</i>	IS4430	Neurofibromatosis 2 gene prod. (pS518)	AW7750	p53 (pS392)
MC0520	MARCKS (pS158) <i>NP</i>	Q34750	Neurofilament (200kD phospho) - Ms Mab	V03020	p53 (pS392) - Mouse Mab
CF5220	MBP (pT98) - Mouse Mab	JW4470	NF2 (pS518)	MB9130	p53 (pS46) <i>NP</i>
BD0700	MCM2 (pS108) <i>BP</i>	JW4480	NFAT1 (pS54)	JW4540	p53 (pS6) <i>BP</i>
KQ6640	MCM2 (pS108), for IHC	KM5210	NFKB (pS536) <i>BP</i>	JW4550	p53 (pS9) <i>BP</i>
GR4350	MCM2 (pS27) <i>BP</i>	KP7760	NFKB p100 (pS865)	KM5430	p53 (pT18) <i>BP</i>
KQ4570	MCM2 (pS27), for IHC	KP7790	NFKB p105 (pS337)	MC0420	p56Dok-2 (pY299) <i>NP</i>
KQ8070	MCM2 (pS40/S41) <i>BP</i>	KP7800	NFKB p105 (pS893)	MC0400	p62Dok(pY362) <i>NP</i>
KQ6610	MCM2 (pS40/S41), for IHC	KP7810	NFKB p105 (pS907)	MC0410	p62Dok(pY398) <i>NP</i>
GR5790	MCM2 (pS41) <i>BP</i>	KM5200	NFKB p65 (pS536) <i>BP</i>	MC0460	p70 S6 Kinase (pS424) <i>NP</i>
KQ3980	MCM2 (pS41), for IHC	MB8380	NFKB-p100/p52 (pS865) <i>NP</i>	MC0270	p70 S6 Kinase (pT421) <i>NP</i>
KQ5080	MCM2 (pS53) <i>BP</i>	MB8390	NFKB-p100/p52 (pS869) <i>NP</i>	MC0370	p70 S6 Kinase:pS411) <i>NP</i>
JW4260	MDM2 (pS185)	MB8400	NFKB-p105/p50 (pS337) <i>NP</i>	MB8780	p73 (pY99) <i>NP</i>
CF9960	MeCP2 (pS178) <i>BP</i>	MB8410	NFKB-p105/p50 (pS893) <i>NP</i>	MB9180	p90RSK(pT348) <i>NP</i>
KM5070	MeCP2 (pS292) <i>BP</i>	MB8420	NFKB-p105/p50 (pS907) <i>NP</i>	MB8770	p95/NBS1 (pS343) <i>NP</i>
MC0600	MEF2A (pS408) <i>NP</i>	MC0240	NFKB-p105/p50 (pS932) <i>NP</i>	JW4570	PAG3 (pY724)
MB8610	MEF2A (pT312) <i>NP</i>	MC0610	NFKB-p105/p50 (phospho-Se927) <i>NP</i>	JW4580	PAG3 (pY763)
MB9920	MEK1 (pS217) <i>NP</i>	MB8340	NFKB-p65 (pS276) <i>NP</i>	CF9980	PAK 1 (pS199/204) <i>BP</i>
KM5080	MEK1 (pS217/221) <i>BP</i>	MC0300	NFKB-p65 (pS311) <i>NP</i>	MB9590	PAK 1 (pT212) <i>NP</i>
MB9640	MEK1 (pS221) <i>NP</i>	MB8360	NFKB-p65 (pS468) <i>NP</i>	JW4620	PAK 1/2/3 (pS141) <i>BP</i>
JW4270	MEK1 (pS298)	MB9970	NFKB-p65 (pS529) <i>NP</i>	JW4590	PAK 1/2/3 (pT402) <i>BP</i>
MC0530	MEK1 (pT291) <i>NP</i>	MB8370	NFKB-p65 (pS536) <i>NP</i>	JW4600	PAK 1/2/3 (pT423) <i>BP</i>
BC4140	MEK1 (pT292)	MB8330	NFKB-p65 (pT254) <i>NP</i>	MB9680	PAK 1/2/3 (pT423/T402/T421) <i>NP</i>
BC4130	MEK1 (pT386)	MB8350	NFKB-p65 (pT435) <i>NP</i>	JW4650	Paxillin (pS126)
AW7730	MEK1/2 (pS218/222)	GG4170	NMDA NR2A (mouse/rat phospho)	GR5490	Paxillin (pS178) <i>BP</i>
CF9970	MEK1/2 (pS218/222) <i>BP</i>	GG4180	NMDA NR2B (mouse/rat phospho)	MB9080	Paxillin (pY118) <i>NP</i>
JW4300	MEK1/2 (pS222)	JW4500	NMDA NR2B (pY1252)	MB9900	Paxillin (pY311) <i>NP</i>
MB8310	MEK2 (pT394) <i>NP</i>	JW4510	NMDA NR2B (pY1336)	JW4670	PDE4A (pS)
KM5090	MEK3 (pS189) <i>BP</i>	AW7630	NMDA NR2B (pY1472)	JW4690	PDGF Receptor alpha (pY742)
JW4330	MEK3/6 (pS189)	MB9170	NMDAR1 (pS896) <i>NP</i>	JW4680	PDGF Receptor alpha (pY754)

NP : means non-phosphospecific match-paired antibody is available
BP : means Blocking Peptide is available

Post-translational modifications

Phosphorylation



Antibodies against phosphorylated proteins (continued)

Cat #	Name	Cat #	Name	Cat #	Name		
JW4700	PDGF Receptor alpha (pY762)	MB8320	PTEN (pS380)	KM5730	SEPARIN (pS1126)		
KM5450	PDGFR (pY740)	BP	MB8760	PTEN (pS380/T382/T383)	NP		
JW4710	PDGFR alpha + beta (pY572 + Y574)	JW5040	PTEN (pS380/T382/T383/S385)	KM5710	SEPARIN (pS1501)		
KM5440	PDGRF (pY579)	BP	KM5480	PTPa (pS180)	JW5300	SHC (pY239/240)	
KM5460	PK1 (pS241)	BP	KM5490	PTPa (pS204)	MC0630	Shc1 (pY349)	
MB8280	PDK1 (pS241)	NP	MB9960	PYK2 (pY402)	NP		
JW4720	PED / PEA 15 (pS116)	JW5060	PYK2 (pY579)	MC0640	Shc1 (pY427)		
IS7630	PHF (pS396) - Mouse Mab	JW5070	PYK2 (pY579/Y580)	JW5310	SHP2 (pS576)		
IS7430	PHF (pT231) - Mouse Mab	JW5080	PYK2 (pY580)	MC0650	SHP2 (pY542)		
CB7350	phospholamban (pS16)	JW5090	PYK2 (pY881)	MC0660	SHP2 (pY580)		
JW2670	phosphotyrosine (pY120) - Mouse Mab	JW5100	Rabphilin 3A (pS234)	MC0670	Smad1 (pS465)		
JW4780	PKA a+b (catalytic subunits) (pT197)	JW5110	RAC1 + Cdc42 (pS71)	JW5340	Smad2 (pS465/467)		
CF9990	PKA alpha (pY197)	BP	AL0620	Rad17 (pS645)	MC0680	Smad2 (pS467)	
JW4790	PKA beta (catalytic subunit) (pS338)	BP	KM5500	Rad9 (pS272)	JW5350	Smad2 (pT8)	
AL8680	PKA phosphopep. Substrate - Mouse Mab	BP	KM5510	Rad9 (pS277)	KM5740	SMAD3 (pS204)	
JW4770	PKA2 beta (regul. subunit) (pS114)	BP	KM5520	Rad9 (pS328)	KM5750	SMAD3 (pS208)	
JW4800	PKC alpha (pT638)	BP	KM5530	Rad9 (pS336)	KM5760	SMAD3 (pS213)	
CG0000	PKC alpha (pY497)	BP	KM5540	Rad9 (pS341)	JW5360	Smad3 (pS423/425)	
MB9700	PKC beta (pT642)	NP	KM5550	Rad9 (pS375)	KM5770	SMC1 (pS957)	
JW4810	PKC beta 1 (pT642)	JW4850	PKC delta (pS664)	BP	MB9880	SMC1 (pS957)	
JW4820	PKC beta 1 + beta 2 (pT500)	JW4860	PKC delta (pS311)	BP	AL0330	SMC1 (pS966)	
JW4830	PKC beta 2 (pT641)	JW4870	PKC epsilon (pS729)	BP	KQ6550	SMC1 (pS966), for IHC	
JW4840	PKC delta (pS645)	JW4880	PKC eta (pS674)	BP	HP7550	SMC3 (pS1083)	
MC0540	PKC delta (pS645)	NP	JW4890	PKC eta (pT655)	AL0360	SMC3 (pS383)	
JW4850	PKC delta (pS664)	JW4900	PKC gamma (pT514)	NP	JW5390	SOX9 (pS181)	
JW4860	PKC delta (pS311)	JW4910	PKC gamma (pT655)	JW4920	PKC gamma (pT674)	KM5780	Src (pY215)
JW4870	PKC epsilon (pS729)	JW4930	PKC iota + lambda (pT555/563)	JW4930	PKC mu / PKD (pS738/742)	MB9100	Src (pY418)
JW4880	PKC eta (pS674)	JW4970	PKC mu / PKD (pS738/742)	CF5030	PKC theta (pS345/348)	MB9580	Src (pY529)
JW4890	PKC eta (pT655)	JW4950	PKC theta (pS676)	JW4950	PKC theta (pS676)	JW5420	Src Family Neg. Reg. pSite (pY522)
JW4900	PKC gamma (pT514)	MC0550	PKC theta (pS676)	JW4960	PKC theta (pS695)	CG0050	STAT1 (pS727)
JW4910	PKC gamma (pT655)	JW4960	PKC theta (pS695)	MB9710	PKC theta (pS695)	JW2700	STAT1 (pS727) - Mouse Mab
JW4920	PKC gamma (pT674)	JW4940	PKC theta (pT538)	JW4940	PKC theta (pT538)	KM5810	STAT1 (pY701)
JW4930	PKC iota + lambda (pT555/563)	MC0620	PKC zeta (pT410)	MB8970	PKD/PKC mu (pS738)	MB8640	STAT1 (pY701)
JW4970	PKC mu / PKD (pS738/742)	MB9710	PKC theta (pS695)	MB9120	PKD/PKC mu (pS910)	MB9660	STAT1 (pY727)
CF5030	PKC theta (pS345/348)	JW4940	PKC theta (pT538)	AL8630	PKG phosphopep. Substrate - Mouse Mab	KM5820	STAT3 (pS727)
JW4950	PKC theta (pS676)	MC0620	PKC zeta (pT410)	MC0440	PKR (pT446)	MB8660	STAT3 (pS727)
MC0550	PKC theta (pS676)	MB8970	PKD/PKC mu (pS738)	MC0490	PKR (pT451)	MB5830	STAT3 (pY705)
JW4960	PKC theta (pS695)	MB9120	PKD/PKC mu (pS910)	CG0010	PKR (pY258)	MB8650	STAT3 (pY705)
MB9710	PKC theta (pS695)	AL8630	PKG phosphopep. Substrate - Mouse Mab	CG0020	PKR (pY446)	KM1700	STAT3 (pY727)
JW4940	PKC theta (pT538)	MC0440	PKR (pT446)	CG0030	PKR (pY451)	KM5840	STAT4 (pS722)
MC0620	PKC zeta (pT410)	MC0490	PKR (pT451)	CG0040	PKR (pY451) (mouse)	KM5850	STAT4 (pY693)
MB8970	PKD/PKC mu (pS738)	CG0010	PKR (pY258)	MB9160	PLCg-1 (pY783)	MB8670	STAT4 (pY693)
MB9120	PKD/PKC mu (pS910)	CG0020	PKR (pY446)	MB9730	PLCg-2 (pY753)	JW5480	STAT5 (pY694)
AL8630	PKG phosphopep. Substrate - Mouse Mab	CG0030	PKR (pY451)	GK2370	PLM (pS68) - Mouse Mab	IS7650	STAT5 (pY695/699) - Mouse Mab
MC0440	PKR (pT446)	CG0040	PKR (pY451) (mouse)	KM6030	PLM (pS83) (mouse)	KM5860	STAT5a (pS726)
MC0490	PKR (pT451)	MB9160	PLCg-1 (pY783)	KM6020	PLM (pS88) (mouse)	MB8690	STAT5a (pS780)
CG0010	PKR (pY258)	MB9730	PLCg-2 (pY753)	JW5000	Polo Like Kinase Kinase (pS482/486/490)	KM5870	STAT5a (pY694)
CG0020	PKR (pY446)	GK2370	PLM (pS68) - Mouse Mab	BU9600	Potassium Channel, Kv3.1 (pS503)	MB8680	STAT5a (pY694)
CG0030	PKR (pY451)	KM6030	PLM (pS83) (mouse)	CF5200	PPAR alpha (pS12) (mouse)	MB8710	STAT6 (pT645)
CG0040	PKR (pY451) (mouse)	KM6020	PLM (pS88) (mouse)	CF5170	PPAR alpha (pS21) (mouse)	KM5880	STAT6 (pY641)
MB9160	PLCg-1 (pY783)	JW5000	Polo Like Kinase Kinase (pS482/486/490)	JW5010	PRAS 40 (pT246)	MB8700	STAT6 (pY641)
MB9730	PLCg-2 (pY753)	BU9600	Potassium Channel, Kv3.1 (pS503)	MB8930	Progesterone Receptor (pS190)	KP8230	STAT6 (pY645)
GK2370	PLM (pS68) - Mouse Mab	CF5200	PPAR alpha (pS12) (mouse)	AW5240	Progesterone Receptor (pS190) - Mouse Mab	MC0130	Stathmin 1 (pS15)
KM6030	PLM (pS83) (mouse)	CF5170	PPAR alpha (pS21) (mouse)	AW5250	Progesterone Receptor (pS294) - Mouse Mab	MC0040	Stathmin 1 (pS24)
KM6020	PLM (pS88) (mouse)	JW5010	PRAS 40 (pT246)	MB8820	PTEN (pS370)	MC0050	Stathmin 1 (pS37)
JW5000	Polo Like Kinase Kinase (pS482/486/490)	MB8930	Progesterone Receptor (pS190)	KM5470	PTEN (pS380)	AW8690	Survivin (pT34) - Astrocyte Marker
BU9600	Potassium Channel, Kv3.1 (pS503)	AW5240	Progesterone Receptor (pS190) - Mouse Mab			JW2900	Syk (pY323 human / Y317 mouse)
CF5200	PPAR alpha (pS12) (mouse)	AW5250	Progesterone Receptor (pS294) - Mouse Mab			KM5890	Syk (pY525/526)
CF5170	PPAR alpha (pS21) (mouse)	MB8820	PTEN (pS370)			JW5500	Synapsin (pS549)
JW5010	PRAS 40 (pT246)	KM5470	PTEN (pS380)			JW5510	Synapsin (pS62/67)
MB8930	Progesterone Receptor (pS190)					MC0350	Synapsin (pS9)
AW5240	Progesterone Receptor (pS190) - Mouse Mab					JW5520	Synuclein alpha (pS129)
AW5250	Progesterone Receptor (pS294) - Mouse Mab					GP8000	TAO 2 (pS181)
MB8820	PTEN (pS370)					JW5590	Tau (pS199)
KM5470	PTEN (pS380)					JW5600	Tau (pS199/202)
						JW5600	Tau (pS202)

NP : means non-phosphospecific match-paired antibody is available
 BP : means Blocking Peptide is available

Antibodies against phosphorylated proteins (continued)

Cat #	Name		Cat #	Name		Cat #	Name	
MB9220	Tau (pS214)	NP	CF5130	Topo II alpha (pT1342) - Mouse Mab		MB9040	VEGFRceptor 2 (pY1214)	NP
MB9190	Tau (pS235)	NP	KM5950	TrkA (pY490)	BP	MB9050	VEGFRceptor 2 (pY951)	NP
MB9240	Tau (pS262)	NP	KM5960	TrkA (pY674/675)	BP	JW2710	Vimentin (pS55) - Mouse Mab	
JW5620	Tau (pS356)		KM5970	TrkA (pY676)	BP	JW2880	Vinculin (pY100)	
MB9150	Tau (pS396)	NP	KM5980	TrkA (pY791)	BP	JW2890	Vinculin (pY1065)	
JW5630	Tau (pS400)		O22290	Troponin I-Cardiac (phospho) - Mouse Mab		JW5770	Vinculin (pY822)	
MB9250	Tau (pS404)	NP	JW5700	Tryptophan Hydroxylase (pS260)		BH9900	WASP (pS483/S484)	BP
JW5640	Tau (pS409)		KM5990	TyK2 (pY1054/1055)	BP	KM6000	Wee1 (pS123)	BP
JW5650	Tau (pS422)		768444	Tyrosine Hydroxylase (pS19)		KM6010	Wee1 (pS53)	BP
MB9200	Tau (pT181)	NP	768443	Tyrosine Hydroxylase (pS31)		GR5590	XRCC 1 (pS461)	BP
MB9210	Tau (pT205)	NP	AW7760	Tyrosine Hydroxylase (pS40)		GR3500	XRCC 1 (pS475)	
JW5670	Tau (pT212)		MB9950	VASP (pS157)	NP	GR6060	XRCC 1 (pS485/T488)	BP
JW5680	Tau (pT217)		MB9610	VASP (pS238)	NP	GR4760	XRCC 1 (pS518/T519/T523)	BP
MB9230	TH (pT231)	NP	MB9480	Vav (pY174)	NP	KM5790	YES1 (pY527)	BP
CG0060	TH (pS40)	BP	JW5710	VAV1 (pY160)		JW2850	Zap-70 (pY292)	
KM5920	TNFR (mouse pS299)	BP	JW5720	VAV3 (pY173)		JW2860	Zap-70 (pY315/319)	
KM5910	TNFR (pS274)	BP	JW5750	VEGF Receptor 2 (pY1054)		MB9620	Zap-70 (pY319)	NP
KM5900	TNFR1 (mouse pS269)	BP	JW5730	VEGF Receptor 2 (pY1054/1059)		MB9630	Zap-70 (pY493)	NP
KM5930	TNIK (pS769)	BP	JW5760	VEGF Receptor 2 (pY1214)				
KM5940	TNIK (pS769)	BP	MB9030	VEGFRceptor 2 (pY1175)	NP			

NP : means non-phosphospecific match-paired antibody is available
BP : means Blocking Peptide is available

Active kinases and phosphates for enzyme assays

Active Kinases

Cat #	Name		Cat #	Name		Cat #	Name	
CK756-	ABL1, active	Mouse	CQ174-	CLK1, active	Human	CC776-	MAPKAPK2, active	Human
CK757-	ABL2, active	Human	CK782-	COT, active	Human	CC777-	MAPKAPK3, active	Human
CC749-	AKT1, active	Human	CC764-	CSK, active	Human	CQ180-	MARK1, active	Human
CC750-	AKT2, active	Human	CC765-	DDR2, active	Human	CM137-	MARK3, active	Human
CC751-	AKT3, active	Human	CK789-	EPHA1, active	Mouse	CI313-	MEK1, active	Mouse
CK780-	ALK4, active	Human	CK790-	EPHB1, active	Mouse	CM161-	MEK2, active	Human
CI307-	AMPK (A1/B1/G1), active	Human	CG089-	EPHB2, active	Human	CG100-	MET, active	Rat
CM133-	AMPK (A2/B1/G1), active	Human	CK759-	EPHB3, active	Human	CK784-	MINK1, active	Human
CQ171-	AMPK(A1/B1/G2), active	Human	CC766-	ERK1, active	Human	CQ181-	MKK3, active	Human
CC752-	ASK1, active	Human	CM128-	ERK2, active	Human	CM181-	MKK4, active	Human
CG083-	AURORA A, active	Mouse	CG090-	FAK, active	Human	CQ182-	MKK6, active	Human
CI308-	AURORA A, active	Human	CK791-	FER, active	Mouse	CK785-	MLCK, active	Human
CI309-	AURORA B, active	Human	CG091-	FES, active	Human	CI314-	MNK2, active	Human
CC753-	BLK, active	Human	CG093-	FGFR1 (FLT2), active	Human	CM129-	MRCCK α , active	Human
CC755-	BMX, active	Human	CQ175-	FGFR1 (V561M), active	Human	CQ183-	MRCCK β , active	Human
CQ172-	BRAF, active	Human	CQ176-	FGFR3, active	Human	CG101-	MST1, active	Human
CC756-	BRK, active	Human	CC768-	FGR, active	Human	CG102-	MST3, active	Human
CI310-	BTK, active	Human	CK792-	FLT3, active	Human	CG104-	MST4, active	Human
CG084-	CAMK1, active	Mouse	CK793-	FMS, active	Human	CK786-	MYO3 β , active	Human
CC757-	CAMK1 β , active	Mouse	CC769-	FRK, active	Human	CC778-	NEK2, active	Human
CC759-	CAMK1 γ , active	Human	CC770-	GRK5, active	Human	CC779-	NEK6, active	Human
CG085-	CAMK1 γ , active	Human	CI311-	GSK3 α , active	Human	CC780-	NEK7, active	Human
CC758-	CAMK1 δ , active	Human	CC771-	GSK3 β , active	Human	CC782-	p38 α , active	Human
CK758-	CAMK2 α , active	Human	CC772-	HCK, active	Human	CC786-	p38 β , active	Human
CQ173-	CAMK2 β , active	Human	CG094-	HER2, active	Human	CC784-	p38 γ , active	Human
CC760-	CAMK4, active	Human	CG095-	HIPK1, active	Human	CC783-	p38 δ , active	Human
CK788-	CAMKK1, active	Human	CQ177-	IRAK2, active	Human	CC785-	p70S6K, active	Human
CG086-	CAMKK2, active	Human	CQ178-	IRAK4, active	Human	CQ184-	PAK3, active	Mouse
CG087-	CDK2/Cyclin A2, active	Human	CG098-	ITK, active	Human	CC787-	PAK4, active	Human
CK781-	CDK4/Cyclin D1, active	Human	CC773-	JNK1, active	Mouse	CC788-	PAK7, active	Human
CG-88-	CDK5/p25, active	Human	CI312-	KDR, active	Human	CC789-	PDGFR α , active	Mouse
CC761-	CHK1, active	Human	CQ179-	KHS1, active	Human	CG105-	PDGFR β , active	Human
CC762-	CHK2, active	Human	CC774-	LCK, active	Human	CG106-	PDK1, active	Human
CC763-	CK2 α 1, active	Human	CK783-	LOK, active	Human	CC790-	PIM1, active	Human
CK787-	c-KIT, active	Human	CC775-	LYN B, active	Human	CC791-	PIM2, active	Human

All items are available in 4 different sizes :
for 1 μ g size : catalog # ends by 0

for 5 μ g size : catalog # ends by 1
for 10 μ g size : catalog # ends by 2

for 20 μ g size : catalog # ends by 3

Post-translational modifications

Phosphorylation



Active kinases et Phosphates for enzyme assays

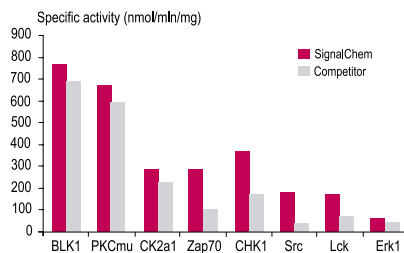
Active Kinases (continued)

Cat #	Name		Cat #	Name		Cat #	Name	
CC792-	PKA α , active	Human	CC804-	PKC ν , active	Human	CK449-	SRC, active	Human
CC793-	PKA β , active	Human	CC806-	PKD2, active	Human	CC813-	STK3, active	Human
CC794-	PKA γ , active	Human	CK760-	PLK1, active	Human	CG112-	SYK, active	Human
CC795-	PKC α , active	Xenopus	CG107-	PYK2, active	Human	CQ186-	TAOK1, active	Human
CM124-	PKC α , active	Human	CC807-	RAF1(EE), active	Human	CQ187-	TAOK2, active	Human
CC796-	PKC β I, active	Human	CC808-	RIPK2, active	Human	CQ188-	TGF β R2, active	Human
CC797-	PKC β II, active	Human	CG108-	ROCK1, active	Human	CG113-	TIE 2, active	Human
CC801-	PKC γ , active	Human	CG109-	ROCK2, active	Human	CC814-	TRKA, active	Human
CC798-	PKC δ , active	Human	CC809-	RSK1, active	Human	CQ189-	TRKB, active	Human
CC799-	PKC ϵ , active	Human	CF786-	RSK2, active	Human	CG114-	TXK, active	Human
CC800-	PKC ζ , active	Human	CG111-	RSK3, active	Human	CC815-	ZAP70, active Active Phosphatases	Human
CC805-	PKC η , active	Human	CC810-	SGK1, active	Human			
CQ185-	PKC θ , active	Human	CC811-	SGK2, active	Human			
CC802-	PKC ι , active	Human	CK794-	SGK3, active	Human			
CC803-	PKC μ , active	Human	CC812-	SRC, active	Rous Sarcoma Virus			

Active Phosphatases

Cat #	Name	
CC742-	DUSP22 (MKPX), active	Human
CC743-	PTPN6 (SHP1), active	Human
CC744-	PTPN7 (LC-PTP), active	Human
CC745-	PTPN11 (SHP2), active	Human
CC746-	PTPN13 (FAP-1), active	Human
CC747-	PTPRC (CD45), active	Human
CC748-	PTPRS (PTP-sigma), active	Human
CG115-	PTPRA (LRP), active	Human
CG116-	PTPRF (LAR), active	Human
CQ190-	PTPN1 (PTP1B), active	Human
CQ191-	PTPN12 (PTP-PEST), active	Human
CQ192-	PTPN2 (TC-PTP), active	Human

Rigorous Quality Control



All items are available in 4 different sizes :

for 1 μ g size : catalog # ends by 0

for 5 μ g size : catalog # ends by 1

for 10 μ g size : catalog # ends by 2

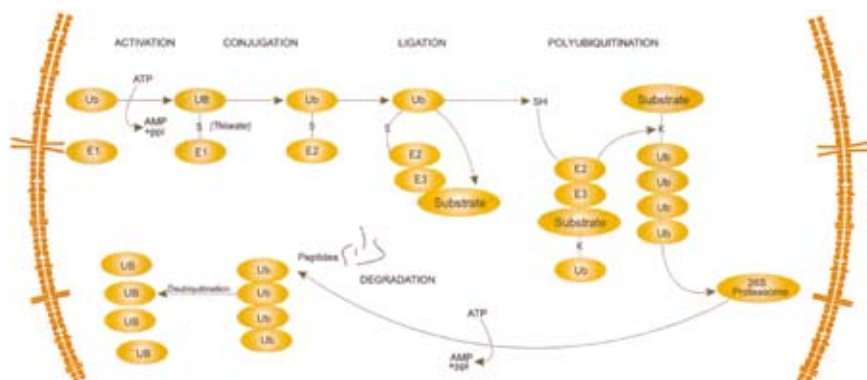
for 20 μ g size : catalog # ends by 3

Ubiquitination & Sumoylation

Ubiquitination

Ubiquitin (Ub) is a 76 amino acid highly conserved eukaryotic polypeptide [5] that selectively marks cellular proteins for proteolytic degradation by the 26S proteasome. The process of target selection, covalent attachment and shuttle to the 26S proteasome is a vital means of regulating the concentrations of key regulatory proteins (as well as misfolded or abnormal proteins) in the cell by limiting their lifespans. Polyubiquitination is a common feature of this modification. The trigger for ubiquitin modification involves multiple avenues including amino-acid sequence specific signals, cleavage or unfolding, and the unmasking of protein structural features via conformational changes, while degradation involves ubiquitin associated changes in the rate of binding to the proteasome. Posttranslational tagging by Ub is involved in a multitude of cellular processes, including the cell cycle, cell growth and differentiation, embryogenesis, apoptosis, signal transduction, DNA repair, regulation of transcription and DNA replication, transmembrane transport, stress response, immune response, and nervous system functions. Increases or decreases in degradation of different substrates by the ubiquitin system have been correlated with a number of diverse diseases, including human papillomavirus, cytomegalovirus, Angelman syndrome, melanoma, and colorectal cancers.

Ubiquitination (Ub) Pathway



Legend: The ubiquitin conjugation cascade starts with the activation of the carboxyl group of Gly-76 of ubiquitin by the ubiquitin-activating enzyme **E1**. This ATP-dependent reaction generates a ubiquitinyl adenylate intermediate bound to the **E1** enzyme. The activated ubiquitin is then transferred to a thiol group of an active site Cys of a ubiquitin-conjugating enzyme **E2**. **E2** enzymes transfer the ubiquitin moiety, either directly to a protein substrate or indirectly in cooperation with a ubiquitin-protein ligase enzyme **E3**, to form a bond between the carboxyl group of Gly-76 of ubiquitin and the protein substrate's internal Lys residue. The first case is catalyzed by **E3** ligases encompassing a RING finger domain, which serve as scaffolds to bring together **E2** enzymes and substrates. The second case is catalyzed by HECT domain **E3** ligases. Once the protein substrate is mono-ubiquitinated, a polyubiquitin chain is formed through the same ubiquitination conjugation cascade. Shuttle to the 26S proteasome results in degradation of the protein substrate into peptides that are 6 to 7 amino acids in length. Remaining ubiquitin moieties are released from the proteasome and recycled back into the ubiquitin pathway via **deubiquitination enzymes**.



Technical tip :

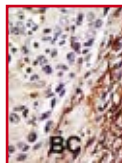
The 3D-structure of ubiquitin solved by X-ray diffraction and NMR has shown that its structure is highly compact and rigid [6,7]. Only the last four C-terminal amino acids are protuberant and unstructured. Within these four residues, Gly-76 is activated in an ATP-dependent manner for subsequent ubiquitin ligation with the α -amino group of an internal Lys residue of the protein substrate. Another important residues, Lys-48, provides an α -amino group to form an additional peptide bond to generate multi-ubiquitin chains.

Post-translational modifications

Ubiquitination & Sumoylation



Western blot analysis of anti-EDD Pab (Cat. #GK6810) in, from left to right, mouse testis, mouse brain, and Jurkat cell line lysate (35µg/lane).



Formalin-fixed and paraffin-embedded human cancer tissue reacted with antibody GK6810, followed by AEC staining. BC = breast carcinoma

Selection of related antibodies

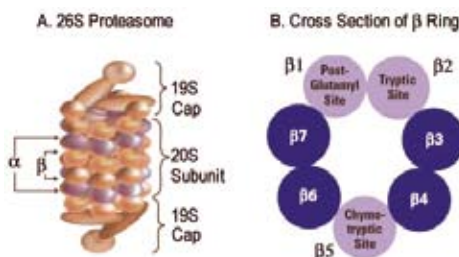
(see ubiquitination antibodies table for a more exhaustive list p. B.51)

Cat. #	Name	Host	Species react.	Application
▶ GK6810	EDD	rabbit pab	Hu, Ms	ELISA, IHC, WB
GK6870	SMURF2	rabbit pab	Hu, Ms	ELISA, IHC, WB
KM3710	UBA5	rabbit pab	Hu	ELISA, WB
▶ GK6900	UBCE7IB1	rabbit pab	Hu, Ms	ELISA, IHC, WB
GK6910	UBCE7IB3	rabbit pab	Hu, Ms	ELISA, IHC, WB
GK7020	UBE1	rabbit pab	Hu	ELISA, IHC, WB
▶ GK3870	Ubiquitin	rabbit pab	Hu	ELISA, IHC, WB
GK7250	UCHL3	rabbit pab	Hu	ELISA, IHC, WB
GK7310	USP1	rabbit pab	Hu	ELISA, IHC, WB
GK7610	USP16	rabbit pab	Hu	ELISA, IHC, WB

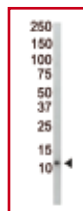
The Ubiquitin Proteasome Pathway : a ubiquitous drug target ?

Most currently available inhibitors of the ubiquitin proteasome pathway directly target and inhibit the **20S proteasome**, the core of the proteolysis machinery, rather than the upstream ubiquitination mechanism.

The proteasome inhibitors are broadly categorized into two groups: synthetic analogs and natural products (see [8] for review). Synthetic proteasome inhibitors target serine and cysteine proteases, therefore inhibiting the proteolytic activity within the proteasome.



Western blot analysis of anti-Ubiquitin Pab (Cat. #GK3870) in HeLa cell lysate. Chemiluminescent detection.



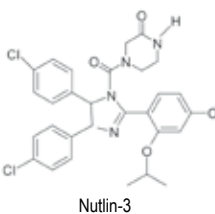
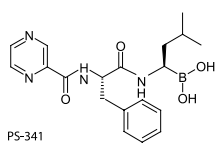
Formalin-fixed and paraffin-embedded human cancer tissue reacted with GK6900 antibody, followed by AEC staining. BC = breast carcinoma

Like other proteasome inhibitors, PS-341 (bortezomib) blocks cell cycle progression, eventually leading to apoptosis [9]. PS-341 blocks NF- κ B activation by inhibiting I κ B α degradation by the proteasome [10]. Natural products are also selective and potent proteasome inhibitors. The **NF- κ B** pathway is intrinsically linked to the ubiquitin proteasome pathway. Ubiquitin not only targets I κ B α for degradation, but also the NF- κ B precursors, p105 and p100, for processing into mature forms by the proteasome. Moreover, upstream kinases in the NF- κ B pathway are activated by ubiquitination independently of protein degradation [11]. Because of the central role of NF- κ B in the inflammation response, proteasome inhibitors have been under heavy investigation for any effect on tumor growth and therapeutic implications in general.

With the success of bortezomib to control protein degradation and subsequently tumor growth, the other enzymes of the ubiquitin proteasome pathway are now potential targets for drug development. The **E1, E2, and E3 enzymes**, as well as **DUBs** (deubiquitination enzymes : **UCH** or **USP**), are now being investigated by numerous drug companies for different indications, such as cancers and cachexia, a muscle atrophy observed in 60-90% of cancer patients.

Other potential therapeutic indications for effectors of the ubiquitin pathway enzymes include diabetes, cardiovascular diseases, metabolic diseases, and inflammation and neurodegenerative diseases. Most of the product development is still in discovery or preclinical phase, therefore little is known on these efforts (reviewed in [12,13]). E2 and E3 ligase inhibitor programs are ongoing at many pharmaceutical industries. Meso Scale Discovery has identified compounds inhibiting **Mdm2**, an E3 ubiquitin ligase that degrades **p53** [14]. Roche has identified inhibitors, called **nutlins**, that block protein-protein interaction between Mdm2 and p53 [15].

A recent study of **nutlin-3** on cancer models showed a good efficacy against tumors, suggesting applications to wild-type p53 tumors with normal Mdm2 expression [16]. Rigel Pharmaceuticals, in collaboration with Johnson & Johnson Pharmaceutical Research and Development, identified **UHRF1** as an E3 ligase involved in tumor proliferation. Johnson & Johnson will develop drug compounds against UHRF1 that will be tested for inhibiting tumor growth or sensitizing tumor cells to chemotherapeutic agents [17].

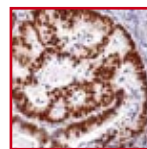


Related antibodies

Cat. #	Name	Host	Species react.	Application	
▶ GK9270	IκBα sumoylation site	rabbit Pab	Hu	ELISA, WB	BP ◀
GK4130	Mdm2	rabbit Pab	Hu, Ms	ELISA, WB, IHC	BP
GH6156	NF-κB	rabbit Pab	Hu, Rat, Rb	WB, IHC	SS
▶ 165840	p53	mouse Mab	Hu, Mk, Bov	WB, IF, IP, GS, FC, IHC	SS ◀
KX9850	Proteasome 20S	rabbit Pab	Hu, Ms, Rt, Ca, Ha	WB	BP
GK7250	UCHL3	rabbit Pab	Hu	ELISA, IHC, WB	BP
GK7260	UCHL5	rabbit Pab	Hu, Ms	ELISA, WB	BP
CG6020	UHRF1	mouse Pab	Hu	WB	BP
BL0661	USP2	rabbit Pab	Hu	ELISA, IHC, WB	BP
GK7430	USP7	rabbit Pab	Hu	ELISA, IHC, WB	BP
GK7560	USP13	rabbit Pab	Hu, Ms	ELISA, WB, IHC	BP
GK7740	USP25	rabbit Pab	Hu, Rat	ELISA, WB, IHC	BP

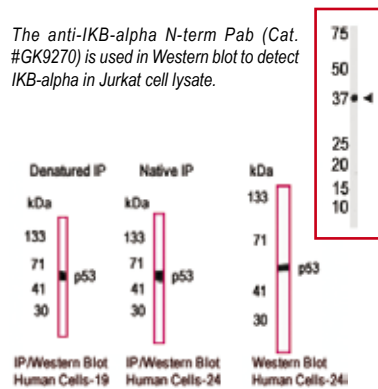
Related proteins and compounds

GK030	Nutlin-3		1, 5, 10 & 50 mg
CG604	UHRF1 partial lrecombinant protein	-	10, 25 µg



Formalin-fixed, paraffin-embedded human colon carcinoma stained with NeoMarkers p53 (Cat. #165840) using peroxidase-conjugate and DAB chromogen. Note nuclear staining of tumor cells.

The anti-IκB-alpha N-term Pab (Cat. #GK9270) is used in Western blot to detect IκB-alpha in Jurkat cell lysate.

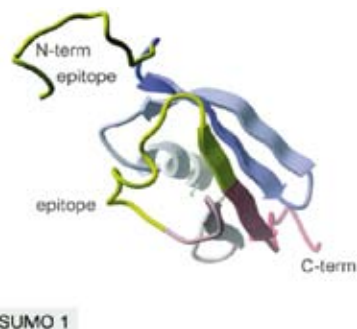


IP and WB with antibody # 165840

Sumoylation

Sumoylation is a novel posttranslational modification system that has been the object of intense interest in recent years.

Reversible covalent attachment of the small ubiquitin-like modifier (SUMO) to lysine residues in substrate proteins alters the properties of the proteins to which SUMO conjugates. Sumoylation orchestrates a diverse array of effects on many different biological processes, including protein localization and stability, transcriptional activities, nucleocytoplasmic signaling and transport, and genomic replication, as well as the regulation of gene expression and viral reproduction. At least 100 protein substrates with important functions modified by sumoylation have been identified, and the list is growing as scientists begin to appreciate the abundance and impact of this posttranslational modification. In addition to tumor suppressors p53 and its regulatory proteins, these include transcriptions factors such as receptors for androgen, progesterone and glucocorticoids, c-JUN, and c-Myb. DNA repair and replication targets include topoisomerases I and II, PCNA, and histone deacetylase, with other modified proteins including CREB, LEF1, RNA polymerase III, SMAD4, and critical proteins in the SARS and CMV viral life cycles. SUMO isoforms have been shown to modulate cellular level pathologies associated with diseases such as Alzheimer's, Huntington's disease, spinocerebellar ataxias, Machado-Joseph disease, and Type I diabetes, findings that are likely to expand as the role of sumoylation in regulating intricate cellular machinery becomes better understood.



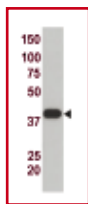
SUMO Isoforms

In vertebrates, four SUMO isoforms, SUMO-1, SUMO-2, SUMO-3, and SUMO-4, have been identified with distinct functions. The SUMO-2 and SUMO-3 proteins share 95% amino acid sequence identity, but only approximately 47% identity with SUMO-1.

Tissue-specific SUMO-4, identified in human kidney, bears homology to SUMO-2/3, suggesting that some SUMO proteins could have tissue-dependent functions [18].

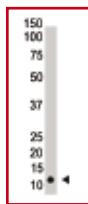
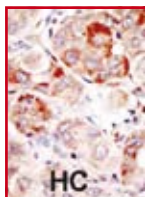
Post-translational modifications

Ubiquitination & Sumoylation

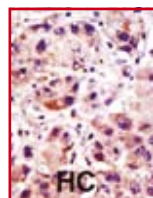


The anti-SUMO1 Pab (Cat.# GK3750) is used in Western blot to detect GST-SUMO1 fusion protein.

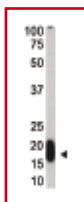
Formalin-fixed and paraffin-embedded human cancer tissue with the cat # GK3820, followed by AEC staining. HC = hepatocarcinoma.



The anti-SUMO3 Pab (Cat.# GK3820) is used in Western blot to detect SUMO3 in Jurkat cell lysate.

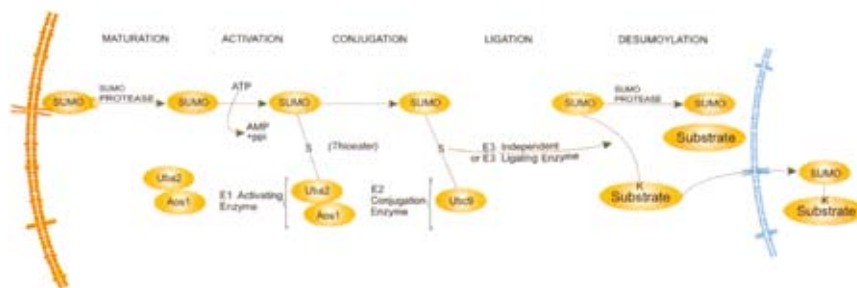


Formalin-fixed and paraffin-embedded human cancer tissue with the cat #GK4190, followed by AEC staining. HC = hepatocarcinoma.



The anti-UBC9 Pab (Cat.#GK4190) is used in Western blot.

Sumoylation Pathway



Legend : The mechanism involved in preparation and transfer of SUMO to target substrates is comprised of four steps: maturation, activation, conjugation, and ligation. In the first step the SUMO protein is cleaved by a SUMO-specific carboxyl-terminal hydrolase to produce a carboxyl-terminal diglycine. SUMO modification then proceeds by a three-step enzyme shuttle, a process composed of an E1-E2-E3 enzyme catalyzed cascade of activation (E1), conjugation to E2 (UBC9), which is homologous to the ubiquitin E2s, and transfer to the terminal amino group of a lysine side chain in target proteins, which may require E3 (ligase). SUMO covalent linkage to the substrate protein is reversible, and SUMO-deconjugating enzymes add an additional layer to the regulation of the sumoylation process.

Selection of related antibodies

(see sumoylation antibodies paragraph for a more exhaustive list p.51)

Cat. #	Name	Host	Species react.	Application / Size
GK9340	AOS1	rabbit Pab	Hu, Ms	ELISA, IHC, WB BP
GK3840	NEDD8	rabbit Pab	Hu	ELISA, IHC, WB BP
GK3920	SEN2	rabbit Pab	Hu, Ms	ELISA, IHC, WB BP
GK3970	SEN5	rabbit Pab	Hu	ELISA, IHC, WB BP
GK2500	SUMO1	mouse Mab	Hu	ELISA, WB BP
GK3750	SUMO1	rabbit Pab	Hu	ELISA, IHC, WB BP
GK3810	SUMO2/3	rabbit Pab	Hu, Ms	ELISA, IHC, WB BP
GK3820	SUMO3	rabbit Pab	Hu	ELISA, IHC, WB BP
KM2080	SUMO4	rabbit Pab	Hu	ELISA, IHC, WB BP
GK4190	UBC9	rabbit Pab	Hu	ELISA, IHC, WB BP

SUMO modification of target proteins

A consensus sequence \emptyset -K-x-D/E (where lysine is the modified amino acid, \emptyset is a hydrophobic residue and x is any amino acid residue) is required for SUMO modification both *in vivo* and *in vitro* using [19,20].

SUMO modification is thought to provide a new binding site for interactions with other proteins, thereby acting as a recruiting factor for multiprotein complexes. For example, sumoylation of RanGAP1 facilitates interaction with the nuclear pore protein RanBP2/Nup358. SUMO modification of transcription factors P300 and Elk-1 permits their recruitment of histone deacetylase 6 (HDAC6) and HDAC2. SUMO modification sites are often located in variable loop structures, or at flexible termini, suggesting the SUMO modification may not exert its influence through altering conformation . . .

SUMOplot™ – A tool for prediction of SUMO sites

The existence of the relatively well-defined sumoylation consensus motif permitted the creation of an algorithm that can scan protein primary sequences and identify potential sites. Considering all the proven SUMO targets and sumoylation sequences therein an online tool for predicting SUMO sites has been constructed : <http://www.abgent.com/doc/sumoplot>.



Ubiquitination & Sumoylation related antibodies

These antibodies are rabbit polyclonals except when other host is specified

Cat #	Name		Cat #	Name		Cat #	Name	
GK7970	AMFR (C-term)	BP	GK4140	Mdm2 (C-term)	BP	GK3920	SEN2 (C-term)	BP
GK7960	AMFR (N-term)	BP	GK4130	Mdm2 (N-term)	BP	GK3930	SEN2 (C-term)	BP
GK9310	ANDR Sumoylation site	BP	GK8180	MIB (Center)	BP	GK3910	SEN2 (N-term)	BP
GK4200	AOS1	BP	GK8170	MIB (C-term)	BP	GK3950	SEN3 (C-term)	BP
GK9290	AP-1 Sumoylation site	BP	GK8160	MIB (N-term)	BP	GK3940	SEN3 (N-term)	BP
GK9300	ARNT2 Sumoylation site	BP	GK8360	MJD (C-term)	BP	GK3970	SEN5 (C-term)	BP
GK8090	BAP1 (C-term)	BP	GK8350	MJD (N-term)	BP	GK3960	SEN5 (N-term)	BP
GK8080	BAP1 (N-term)	BP	GK9200	Myb Sumoylation site	BP	GK3990	SEN6 (C-term)	BP
HP7570	BIRC6 / APOLLON	BP	GK8420	NCE2 (C-term)	BP	GK3980	SEN6 (N-term)	BP
GK4160	Cbl (C-term)	BP	GK8410	NCE2 (N-term)	BP	GK4010	SEN7 (C-term)	BP
GK4150	Cbl (N-term)	BP	GK3850	NEDD8 (C-term)	BP	GK4000	SEN7 (N-term)	BP
GK7080	CDC34 (C-term)	BP	GK3840	NEDD8 (N-term)	BP	GK4180	SEN8 (C-term)	BP
GK7070	CDC34 (N-term)	BP	KQ6090	NUP214	BP	GK4170	SEN8 (N-term)	BP
KQ0932	COP1 / RFWD2	BP	KQ7290	NUP214	BP	GK8390	SQSTM1 (C-term)	BP
KQ0930	COP1 / RFWD2	BP	KQ5990	NUP214 - for IHC	BP	GK8340	STAM (C-term)	BP
KQ0931	COP1 / RFWD2	BP	KQ6950	NUP214 - abs pack	BP	GK8330	STAM (N-term)	BP
GK8010	CROC1A (C-term)	BP	GK9260	p53 Sumoylation site	BP	GK4330	SUMO (C-term) (Drosophila)	BP
GK8000	CROC1A (N-term)	BP	HU6440	PARC / H7-AP1 - abs pack	BP	GK4350	SUMO (C-term) (Nematode)	BP
KQ7280	CUL4A	BP	HU5090	PARC / H7-AP1	BP	GK4320	SUMO (N-term) (Drosophila)	BP
KQ4960	CUL4A	BP	GR5800	PARC / H7-AP1	BP	GK4340	SUMO (N-term) (Nematode)	BP
GR5460	CUL7	BP	HU5100	PARC / H7-AP1	BP	GK4360	SUMO (N-term) (Yeast)	BP
GR5630	CUL7	BP	GK4030	PIAS1 (C-term)	BP	GK4370	SUMO (pan)	BP
HU5050	CUL7	BP	GK4020	PIAS1 (N-term)	BP	GK4390	SUMO (pan)	BP
KQ7700	CUL7 - for IHC	BP	GK4040	PIAS3 (C-term)	BP	GK2490	SUMO1 - mouse Mab	BP
GK8240	Dsk2 (C-term)	BP	GK4050	PIAS3 (N-term)	BP	GK2500	SUMO1 - mouse Mab	BP
GK8230	Dsk2 (N-term)	BP	GK4220	PIASny (Center)	BP	KM2050	SUMO1 (C-term D86)	BP
KQ2660	DTX3L / BBAP	BP	GK4210	PIASny (N-term)	BP	GK3750	SUMO1 (C-term)	BP
GK5020	DTX3L / BBAP	BP	GK4080	PIASx1 (N-term)	BP	GK4270	SUMO1 (C-term) (Xenopus)	BP
KQ7430	DTX3L / BBAP - abs pack	BP	GK4070	PIASx1/2 (C-term)	BP	GK3760	SUMO1 (N-term A6)	BP
GK7160	E2EPF (C-term)	BP	GK4060	PIASx1/2 (N-term)	BP	GK3770	SUMO1 (N-term E67)	BP
GK7150	E2EPF (N-term)	BP	KM2060	PIASx1/2 (N-term)	BP	GK3740	SUMO1 (N-term)	BP
KQ5750	EDD1	BP	GK4100	PIASy1 (C-term)	BP	GK4260	SUMO1 (N-term) (Xenopus)	BP
KQ5490	EDD1 - for IHC	BP	GK4090	PIASy1 (N-term)	BP	GK4250	SUMO2 (C-term)	BP
GK7910	EPS15 (C-term)	BP	GK4110	PIASz (N-term)	BP	GK4290	SUMO2 (C-term) (Xenopus)	BP
GK7900	EPS15 (N-term)	BP	GK4120	PIASz1 (C-term)	BP	GK4280	SUMO2 (N-term) (Xenopus)	BP
GK7930	EPS15R (C-term)	BP	BB3930	PIRH2	BP	GK3800	SUMO2/3 (Center)	BP
GK7920	EPS15R (N-term)	BP	GK8320	PLIC1 (Center)	BP	GK3810	SUMO2/3 (C-term)	BP
GK8380	Epsin2a (C-term)	BP	GK8310	PLIC1 (N-term)	BP	GK3790	SUMO2/3 (N-term K5)	BP
GK8370	Epsin2a (N-term)	BP	GK9240	PML Sumoylation site	BP	GK3780	SUMO2/3 (N-term)	BP
KQ0910	FLRF / RNF41 - for IHC	BP	GK9250	PML Sumoylation site	BP	GK2510	SUMO3 - mouse Mab	BP
HU5370	FLRF / RNF41 - abs pack	BP	GK8200	RAD23A (C-term)	BP	GK3830	SUMO3 (C-term P94)	BP
GR5740	FLRF/RNF41	BP	GK8190	RAD23A (N-term)	BP	GK3820	SUMO3 (C-term)	BP
GR6070	FLRF/RNF41	BP	GK8220	RAD23B (C-term)	BP	GK4310	SUMO3 (C-term) (mouse)	BP
GK4380	GST Tag	BP	GK8210	RAD23B (N-term)	BP	GK4300	SUMO3 (N-term) (mouse)	BP
GR4930	HDMX / MDM4	BP	GR5940	RAD6	BP	KM2080	SUMO4 (Center)	BP
KQ2410	HDMX / MDM4 - for IHC	BP	GR5510	RAD6	BP	KN1420	SUMO4 (M55 Wild type)	BP
HU6310	HDMX / MDM4 - abs pack	BP	GR4420	RAD6	BP	KM2070	SUMO4 (N-term)	BP
HP6910	HDMX / MDM4 (pS403)	BP	KQ5610	RAD6 - for IHC	BP	KN1430	SUMO4 (V55 Mutant)	BP
GK7040	HIP2 (Center)	BP	HU6030	RAD6 - abs pack	BP	GK3350	SUSP1 (C-term)	BP
GK8400	HRD1 (C-term)	BP	GK9230	Ran-GTPase Sumoylation site	BP	GK3340	SUSP1 (N-term)	BP
KM3700	HRD1 (N-term)	BP	KQ4240	RNF20	BP	KM2100	SUV39H2 (C-term K375)	BP
GK9210	HSF1 Sumoylation site	BP	KQ5240	RNF20	BP	GK4240	SUV39H2 (C-term)	BP
GK9220	HSF2 Sumoylation site	BP	KQ7400	RNF20 - for IHC	BP	KM2090	SUV39H2 (N-term G107)	BP
KQ3290	HURP / DLG7	BP	KQ7690	RNF20 - abs pack	BP	GK4230	SUV39H2 (N-term)	BP
KQ6120	HURP / DLG7	BP	KQ5960	RNF40	BP	HP6290	TBLR1	BP
KQ8650	HURP / DLG7	BP	KQ4220	RNF40	BP	KQ6190	TBLR1 - for IHC	BP
KQ8130	HURP / DLG7 - abs pack	BP	KQ5360	RNF40	BP	GK7990	TOLLIP (Center)	BP
GK9270	IKBa Sumoylation site	BP	KQ3150	RNF40 - for IHC	BP	GK7980	TOLLIP (C-term)	BP
GK9280	IKBa Sumoylation site	BP	KQ7020	RNF40 - abs pack	BP	GK7840	TSG101 (C-term)	BP
GK7950	IMOS-1 (Center)	BP	HP7250	ROQUIN	BP	GK7830	TSG101 (N-term)	BP
GK7940	IMOS-1 (N-term)	BP	HP6930	ROQUIN	BP	KM3720	Uba5 (C-term)	BP
GK8150	ITCH (C-term)	BP	HP8480	ROQUIN - abs pack	BP	KM3710	Uba5 (N-term)	BP
GK8140	ITCH (N-term)	BP	GK3900	SEN1 (C-term)	BP	KQ4900	UBAP2L / NICE4	BP
HP7510	LASU1 / UREB1	BP	GK3890	SEN1 (N-term)	BP	KQ5330	UBAP2L / NICE4	BP

BP = blocking peptide available SS = small size available

Post-translational modifications

Ubiquitination & Sumoylation



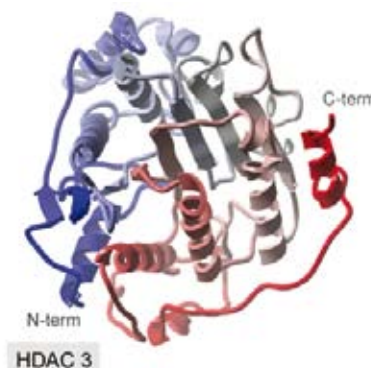
Ubiquitination & Sumoylation related antibodies

Cat #	Name	Cat #	Name	Cat #	Name			
GK7030	UBAP2L / NICE4 - abs pack	BP	GK3880	Ubiquitin	BP	GK7470	USP10 (N-term)	BP
GK2520	UBC9 - mouse Mab	BP	HP6800	Ubiquitin	BP	GK7520	USP11 (C-term R565)	BP
GK2530	UBC9 - mouse Mab	BP	GK3870	Ubiquitin (C-term)	BP	GK7510	USP11 (C-term)	BP
GK4190	UBC9 - mouse Mab	BP	GK3860	Ubiquitin (N-term)	BP	GK7490	USP11 (N-term N20)	BP
GK6900	UBCE7IP1 (C-term)	BP	HP6740	Ubiquitin (plant)	BP	GK7500	USP11 (N-term R41)	BP
GK6890	UBCE7IP1 (N-term)	BP	GK7290	UBL4 (C-term)	BP	GK7540	USP12 (C-term)	BP
GK6920	UBCE7IP3 (C-term)	BP	GK7280	UBL4 (N-term)	BP	GK7530	USP12 (N-term)	BP
GK6910	UBCE7IP3 (N-term)	BP	GK8300	UBQLN3 (C-term)	BP	GK7560	USP13 (Center)	BP
GK6940	UBCE7IP4 (C-term)	BP	GK8290	UBQLN3 (N-term)	BP	GK7550	USP13 (N-term)	BP
GK6930	UBCE7IP4 (N-term)	BP	KM3690	UCHL1 / Park5 (C-term)	BP	GK7580	USP14 (C-term)	BP
GK6960	UBCE7IP5 (Center)	BP	GK7230	UCHL1 / Park5 (N-term)	BP	GK7570	USP14 (N-term)	BP
GK6950	UBCE7IP5 (C-term)	BP	GK7250	UCHL3 (C-term)	BP	GK7600	USP15 (C-term)	BP
GK8130	UBCH9 (C-term)	BP	GK7240	UCHL3 (N-term)	BP	GK7590	USP15 (N-term)	BP
GK8120	UBCH9 (N-term)	BP	GK7270	UCHL5 (C-term)	BP	GK7620	USP16 (Center)	BP
GK7030	UBE1 (Center)	BP	GK7260	UCHL5 (N-term)	BP	GK7610	USP16 (N-term)	BP
GK7020	UBE1 (C-term)	BP	GK7890	UEV (N-term)	BP	GK7640	USP19 (C-term)	BP
KQ4980	UBE1C	BP	KM3740	Ufc1 (C-term)	BP	GK7630	USP19 (N-term)	BP
GK7060	UBE2B (C-term)	BP	KM3730	Ufc1 (N-term)	BP	GK7660	USP20 (C-term)	BP
GK7050	UBE2B (N-term)	BP	GK7310	USP1 (C-term)	BP	GK7650	USP20 (N-term)	BP
GK7140	UBE2C (C-term)	BP	GK7300	USP1 (N-term)	BP	GK7670	USP21 (C-term)	BP
GK7130	UBE2C (N-term)	BP	BL0661	USP2 (C-term L523)	BP	GK7680	USP21 (N-term P31)	BP
GK7010	UBE2D1 (C-term)	BP	GK7330	USP2 (C-term)	BP	GK7700	USP22 (C-term)	BP
GK7180	UBE2G1 (C-term)	BP	BL0660	USP2 (Ctr S260)	BP	GK7690	USP22 (N-term)	BP
GK7170	UBE2G1 (N-term)	BP	GK7320	USP2 (N-term)	BP	GK7720	USP24 (C-term)	BP
GK7210	UBE2G2 (C-term)	BP	GK7350	USP3 (C-term)	BP	GK7710	USP24 (N-term)	BP
GK7200	UBE2G2 (N-term)	BP	GK7360	USP3 (C-term)	BP	GK7740	USP25 (C-term)	BP
GK7190	UBE2H (C-term)	BP	GK7340	USP3 (N-term)	BP	GK7730	USP25 (N-term)	BP
GK7100	UBE2L3 (C-term)	BP	KQ4330	USP4	BP	GK7760	USP26 (C-term)	BP
GK7090	UBE2L3 (N-term)	BP	KQ6220	USP4	BP	GK7750	USP26 (N-term)	BP
GK7120	UBE2L6 (C-term)	BP	KQ8680	USP4 - abs pack	BP	KQ0760	USP28	BP
GK7110	UBE2L6 (N-term)	BP	GK7380	USP4 (Center)	BP	KQ0761	USP28	BP
GK8110	UBE2M (Center)	BP	GK7370	USP4 (C-term)	BP	KQ0770	USP28 - abs pack	BP
GK8100	UBE2M (N-term)	BP	GK7400	USP5 (C-term)	BP	GK7780	USP28 (C-term)	BP
GK7220	UBE2N (N-term)	BP	GK7390	USP5 (N-term)	BP	GK7770	USP28 (N-term)	BP
GK7860	UBE2V (C-term)	BP	GK7420	USP6 (C-term)	BP	GK7800	USP29 (Center)	BP
GK7850	UBE2V (N-term)	BP	GK7410	USP6 (N-term)	BP	GK7790	USP29 (N-term)	BP
GK7880	UBE2V1 (C-term)	BP	BG6870	USP7	BP	KQ3990	USP34	BP
GK7870	UBE2V1 (N-term)	BP	GR3890	USP7	BP	KQ6770	VCP	BP
GK7820	UBE3A (C-term)	BP	KQ3750	USP7 - for IHC	BP	KQ3170	VCP	BP
GK7810	UBE3A (N-term)	BP	HU5310	USP7 - abs pack	BP	KQ7660	VCP - for IHC	BP
GK6980	UBE4A (C-term)	BP	GK7440	USP7 (C-term)	BP	KQ8330	VCP - abs pack	BP
GK6970	UBE4A (N-term)	BP	GK7430	USP7 (N-term)	BP	GK8070	VDU1-I (C-term)	BP
GK7000	UBE4B (C-term)	BP	GK7460	USP8 (C-term)	BP	GK8060	VDU1-I (N-term)	BP
GK6990	UBE4B (N-term)	BP	GK7450	USP8 (N-term)	BP	GK8050	VDU1-II (C-term)	BP
GK8260	Ubiquilin 1 (Center)	BP	KQ1041	USP10	BP	GK8040	VDU1-II (N-term)	BP
GK8250	Ubiquilin 1 (N-term)	BP	KQ1040	USP10	BP	HU5250	WSTF	BP
GK8280	Ubiquilin 3 (C-term)	BP	KQ0990	USP10 - abs pack	BP			
GK8270	Ubiquilin 3 (N-term)	BP	GK7480	USP10 (C-term)	BP			

BP = blocking peptide available SS = small size available

Methylation & Acetylation

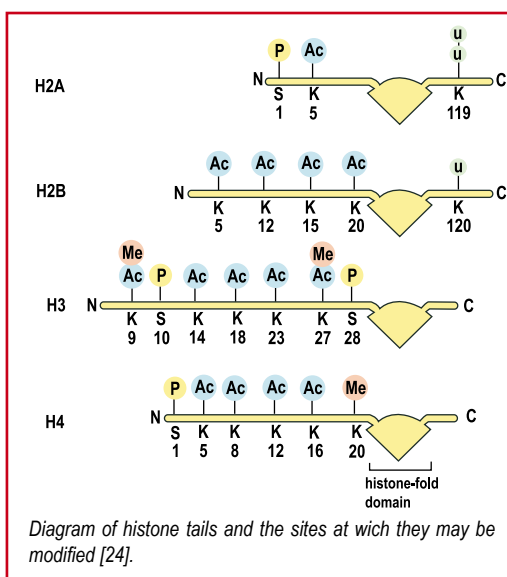
Acetylation and methylation of lysine and arginine residues on core histones H1, H2A, H2B, H3 and H4 plays a pivotal role in a variety of gene activities such as transcription regulation, DNA replication and damage repair, gene silencing and the regulation of cell developmental processes such as cellular differentiation and proliferation. These posttranslational modifications, clustered densely on the highly charged N-terminal tails of histones, engender remodeling of the chromatin structure. Conformational adjustment modulates accessibility to transcription complexes and thereby directs promoter-specific events as well as overall control of chromosomal activity. Key enzymes effecting these modifications are histone acetyltransferase (HAT), histone deacetylase (HDAC), and histone methyltransferase (HMT); indeed the term 'histone code' has come into usage to describe the way in which these posttranslational modification adhere to principles of molecular recognition and information transmission to recruit transcription complexes that direct downstream events. The proper balance of HAT, HDAC, and HMT is essential to appropriate cellular transcription. Even though the regulatory mechanisms driving these modifications are at an early stage of understanding, links to disease states such as leukemia, lupus and Huntington's disease have been established, and therapeutic drugs targeting these modifications are being pursued.



Methylation of a DNA cytosine residue to convert it to 5-methylcytosine occurs at CpG sites. This process is mediated by DNA methyltransferase. The level of methylation of CpG islands, which densely populate near eukaryotic gene promoters, strongly determines gene activity and expression. In normal cells the level of methylation of the promoter flanking CpG islands is low, whereas in cancer cells excessive methylation is observed, which has fueled research into the role that deposition of methyl groups plays in inducing oncogenic transcription. In addition to basic research, early results portend important clinical applications – for example, a hypermethylated gene is found in 90% or more of patients with prostate cancer.

Histone Deacetylases

The wide variety of histone activities is due in no small part to the modifications that occur on the «tail» of the histone, a protruding amino-terminal of ~25-40 residues [21]. These modifications are thought to occur in an orderly manner to affect gene expression by affecting the arrangement of DNA in the nucleosome. Thus, the pattern of modifications, or «histone code,» greatly increases DNA's potential to affect cell function by controlling access to transcription factors [22]. This code is also thought to be involved in epigenetic, or heritable and potentially reversible, changes in chromatin structure [23]. Understanding the underlying patterns of these modifications may hold the key to many types of cellular dysfunction, such as tumorigenesis and myelodysplasia.



HDAC Function

Histone acetylation, neutralizes the positively charged histone so that it interacts more weakly with negatively charged DNA. When histones are deacetylated, the chromatin condenses and the genes exposed in the acetylated state are silenced. Acetylation and deacetylation also work in concert with surrounding methylated DNA to express and silence genes. Transcriptionally active chromatin (euchromatin) is generally unmethylated, since acetylation occurs on the same lysines that are methylated in inactive chromatin (heterochromatin) [25]. Although inhibiting HDAC activity produces large numbers of hyperacetylated histones, transcription does not occur unless chromatin is also demethylated, thus indicating that the two modifications work in concert to control gene transcription [26].

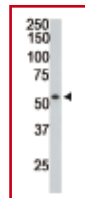
Post-translational modifications

Methylation & Acetylation

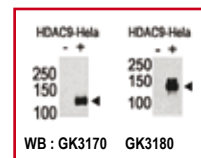


HDACs in disease

Acetylation of histones is primarily controlled by precise interactions between histone acetylases (HATs) and their antagonists, histone deacetylases (HDACs). In cancer, tumor-suppressor genes are sometimes repressed by HDACs, consequently, compounds that inhibit HDAC activity have been identified as potential anti-cancer drugs by a number of pharmaceutical companies. HDAC inhibitors are being tested in a number of different clinical trials against a wide variety of diseases, including leukemia, AIDS, breast cancer, and spinal muscular atrophy.



The anti-HDAC1 Pab (Cat. # GK3010) is used in Western blot to detect HDAC1 in ZR-75-1 cell lysate



Both anti-HDAC9 N-term (GK3170) and C-term (GK3180) Pab were tested by WB and IP-WB using HeLa and HeLa-HDAC9 transfected cells. Figure shows both Pab specifically detect HDAC9 in HeLa-HDAC9 transfected cell but not HeLa alone. (Data kindly provided by Dr. Zhigang Yuan, H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL).

non exhaustive selection of related antibodies

(see Methylation/Acetylation list here under for more antibodies)

Cat #	Name	Host	Species react	Application	
▶ GK3010	HDAC1	rabbit Pab	Hu	ELISA, WB	BP
GK3040	HDAC3	rabbit Pab	Hu, Ms	ELISA, WB	BP
GK3110	HDAC6	rabbit Pab	Hu, Ms	ELISA, WB	BP
▶ GK3170	HDAC9	rabbit Pab	Hu	ELISA, WB, IHC, IP, FC	BP
GK3280	HRX	rabbit Pab	Hu	ELISA, IHC	BP
GK3250	NCOR1	rabbit Pab	Hu, Ms	ELISA, IHC, WB	BP
GL1490	SIRT1	rabbit Pab	Hu, Ms	ELISA, IHC, WB	BP
GL1510	SIRT5	rabbit Pab	Hu	ELISA, IHC, WB	BP

BP = blocking peptide available

Methylation, Acetylation and Histone modification related antibodies

These antibodies are rabbit polyclonals except when other host is specified

Cat #	Name		Cat #	Name		Cat #	Name	
HP7630	ASH2	BP	HU5470	H2AX - abs pack	BP	KQ3950	Histone H4	BP
GR4820	ASH2	BP	CF0440	H2AX gamma - for IHC	BP	KQ6330	Histone H4	BP
GR4200	ASH2	BP	GR6010	H2AX gamma	BP	KQ5800	Histone H4 - for IHC	BP
GR5950	ASH2	BP	KM1900	HAT1 (C-term)	BP	KQ4690	Histone H4 - abs pack	BP
KQ6620	ASH2 - for IHC	BP	KM1890	HAT1 (N-term)	BP	GK3280	HRX (Center)	BP
HU5530	ASH2 - abs pack	BP	KQ4800	HDAC1	BP	GK3270	HRX (C-term)	BP
KM2000	BAT8 (C-term)	BP	KQ4250	HDAC1	BP	HU6040	HSET - abs pack	BP
KM2010	BAT8 (N-term)	BP	KQ2330	HDAC1 - for IHC	BP	GR5620	HSET1	BP
HP7000	CARM1	BP	KQ8730	HDAC1 - abs pack	BP	GR3400	HSET1	BP
HP6340	CARM1	BP	GK3010	HDAC1 (C-term)	BP	GR5560	HSET1	BP
HP7690	CARM1	BP	GK3020	HDAC1 (N-term)	BP	KM1940	HTATIP (C-term)	BP
KQ5830	CARM1 - for IHC	BP	KQ3630	HDAC2	BP	KM1930	HTATIP (N-term)	BP
HU6410	CARM1 - abs pack	BP	KQ1280	HDAC2	BP	KQ0780	JARID1A / RBP2	BP
KM1870	CREBBP (Center)	BP	KQ6320	HDAC2 - for IHC	BP	KQ1120	JMJD1B	BP
KM1860	CREBBP (N-term)	BP	KQ2830	HDAC2 - abs pack	BP	KQ1110	JMJD1C	BP
HP6510	CTBP1	BP	GK3030	HDAC2 (C-term)	BP	KQ4740	JMJD2A	BP
GK2690	Dnmt1 (C-term S1602)	BP	BT0790	HDAC3	BP	KQ6340	JMJD2A	BP
GK2680	Dnmt2	BP	GK3050	HDAC3 (C-term)	BP	KQ1020	JMJD2C	BP
GK2830	Dnmt2 (C-term) (mouse)	BP	GK3040	HDAC3 (N-term)	BP	HP7510	LASU1 / UREB1	BP
GK2820	Dnmt2 (N-term) (mouse)	BP	GK3060	HDAC4 (C-term)	BP	GR3410	LEO1	BP
GK2700	Dnmt3a	BP	GK3070	HDAC4 (N-term)	BP	GR5470	LEO1	BP
GK2710	Dnmt3b	BP	GK3090	HDAC5 (Center)	BP	HU5730	LEO1 - abs pack	BP
GK2800	Dnmt3L (C-term)	BP	GK3100	HDAC5 (C-term)	BP	KM2030	LSD1 (Center)	BP
GK2840	Dnmt3L (mouse)	BP	GK3080	HDAC5 (N-term)	BP	KM2040	LSD1 (C-term)	BP
GK3490	DOT1L (C-term)	BP	GK3110	HDAC6 (C-term)	BP	KM2020	LSD1 (N-term)	BP
GK3480	DOT1L (N-term)	BP	GK3120	HDAC6 (N-term)	BP	GK2730	MBD1 (C-term)	BP
KM1910	EP300 (Center)	BP	GK3130	HDAC7 (C-term)	BP	GK2720	MBD1 (N-term)	BP
KM1920	EP300 (C-term)	BP	GK3140	HDAC7 (N-term)	BP	GK2930	MBD2 (C-term)	BP
KM1810	EUHMTASE1 (Center)	BP	GK3160	HDAC8 (C-term)	BP	GK2920	MBD2 (N-term)	BP
KM1800	EUHMTASE1 (N-term)	BP	GK3150	HDAC8 (N-term)	BP	GK2740	MBD3	BP
HP6690	EZH2 PSER21	BP	GK3180	HDAC9 (C-term)	BP	GK2750	MBD3 (C-term C215)	BP
GK3470	G9a (Center)	BP	GK3170	HDAC9 (N-term)	BP	GK2760	MBD3 (C-term)	BP
GK3460	G9a (N-term)	BP	GK3200	HDAC10 (C-term)	BP	GK2770	MBD4	BP
KM1880	GCN5L2 (C-term)	BP	GK3190	HDAC10 (N-term)	BP	GK2780	MBD4 (Center)	BP
CE1570	GCN5L2 (N-term)	BP	GK3220	HDAC11 (C-term)	BP	GK2790	MBD4 (C-term)	BP
KM1850	GNMT (C-term)	BP	GK3210	HDAC11 (N-term)	BP	KM3970	MD1 (C-term)	BP
KM1840	GNMT (N-term)	BP	KQ8570	Histone H3	BP	KM3960	MD1 (N-term)	BP
AZ3802	H2AX	BP	KQ5600	Histone H3	BP	KM3990	MeCP2 (C-term)	BP
AZ3803	H2AX	BP	KQ8790	Histone H3 - abs pack	BP	KM3980	MeCP2 (N-term)	BP
KQ6800	H2AX - for IHC	BP	GK2810	Histone H3-MeK9	BP	KM5070	MeCP2 (phospho S292)	BP

BP = blocking peptide available

Methylation, Acetylation and Histone modification related antibodies *(continued)*

Cat #	Name		Cat #	Name		Cat #	Name	
C05910	MENIN	BP	GK3600	PRDM8 (PFM5)	BP	GR4270	RTF1	BP
AZ8310	MENIN	BP	GK3610	PRDM9 (C-term)	BP	GR4120	RTF1	BP
GR5260	MENIN	BP	GK2460	PRDM10 - mouse Mab	BP	HU5740	RTF1 - abs pack	BP
A19370	MENIN - goat Pab	BP	GK3620	PRDM10 (N-term)	BP	GK3510	SAE1 (C-term)	BP
A19380	MENIN - agarose immobilized	BP	GK3640	PRDM11 (C-term)	BP	GK3500	SAE1 (N-term)	BP
GR3810	MLL1	BP	GK3630	PRDM11 (N-term)	BP	GK3390	SET07	BP
GR4670	MLL1	BP	GK2480	PRDM12 - mouse Mab	BP	GK2440	SET07 - mouse Mab	BP
BU8680	MLL1	BP	GK3650	PRDM12 (N-term)	BP	KM1640	SET07 - mouse Mab	BP
HP7390	MLL1	BP	GK3670	PRDM13 (C-term)	BP	GK3430	SET1 (C-term)	BP
HU5480	MLL1 - abs pack	BP	GK3660	PRDM13 (N-term)	BP	GK3420	SET1 (N-term)	BP
HP6500	MTA1	BP	GK3690	PRDM14 (PFM11) (C-term)	BP	GK3450	SET2 (C-term)	BP
KQ4490	MTA1 - for IHC	BP	GK3680	PRDM14 (PFM11) (N-term)	BP	GK3440	SET2 (N-term)	BP
HP6840	MTA2	BP	GK3710	PRDM15 (C-term)	BP	KM1990	SET7 (C-term)	BP
HP7520	MTA2	BP	GK3700	PRDM15 (N-term)	BP	KM1980	SET7 (N-term)	BP
HU6330	MTA2 - abs pack	BP	GK3720	PRDM16 (N-term)	BP	GK3410	SET9 (Center)	BP
GR4560	MTA3	BP	GK3730	PRDM17 (N-term)	BP	GK3400	SET9 (C-term)	BP
GK2980	NCE2 (C-term)	BP	KQ3050	PRMT1	BP	GR4370	SETDB1	BP
GK2970	NCE2 (N-term)	BP	KQ4670	PRMT1	BP	KM1790	SETDB1 (C-term)	BP
KM1950	NCOA3 (Center)	BP	KQ5540	PRMT1 - for IHC	BP	KM1780	SETDB1 (N-term)	BP
KM1960	NCOA3 (C-term)	BP	KQ1740	PRMT1 - abs pack	BP	KM1820	SETDB2 (Center C195)	BP
GK3260	NCOR1 (C-term)	BP	GK2600	PRMT1 (C-term)	BP	KM1830	SETDB2 (Center V514)	BP
GK3250	NCOR1 (N-term)	BP	GK2590	PRMT1 (N-term)	BP	KQ7230	SIN3A	BP
KQ6090	NUP214	BP	GK2620	PRMT2 (C-term)	BP	KQ5130	SIN3A	BP
KQ7290	NUP214	BP	GK2610	PRMT2 (N-term)	BP	KQ8220	SIN3A	BP
KQ5990	NUP214 - for IHC	BP	GK2640	PRMT3 (C-term)	BP	GL1470	SIRT1 (C-term)	BP
H80800	p53 acetylated (K320)	BP	GK2630	PRMT3 (N-term)	BP	GK3360	SUV39H1	BP
GS8110	p53 acetylated (K373)	BP	GK2650	PRMT4 (C-term)	BP	GR4720	SUV39H1 - abs pack	BP
KM1770	PAD4 (Center)	BP	KQ4310	PRMT5	BP	GK2430	SUV39H1 - mouse Mab	BP
KM4010	PAD4 (C-term)	BP	KQ7680	PRMT5	BP	BA0610	TRX2	BP
KM4000	PAD4 (N-term)	BP	KQ8110	PRMT5 - abs pack	BP	GK2910	UBA2 (C-term A600)	BP
GR3870	PAF1	BP	GK2670	PRMT5 (C-term)	BP	GK2900	UBA2 (C-term E616)	BP
GR5110	PAF1	BP	GK2660	PRMT5 (N-term)	BP	GK2890	UBA2 (N-term)	BP
HU5720	PAF1 - abs pack	BP	KM1720	PRMT6 (C-term)	BP	GK2860	UBE1C (C-term)	BP
GR5670	Parafibromin	BP	KM1710	PRMT6 (N-term)	BP	GK2850	UBE1C (N-term)	BP
GR5720	Parafibromin	BP	KM1740	PRMT7 (Center)	BP	GK2880	UBE2I (C-term)	BP
HU5710	Parafibromin - abs pack	BP	KM1750	PRMT7 (C-term)	BP	GK2870	UBE2I (N-term)	BP
GK3380	PR/SET07 (C-term)	BP	KM1730	PRMT7 (N-term)	BP	GK2950	UBE2M (C-term)	BP
GK3370	PR/SET07 (N-term)	BP	GK3240	RANBP2 (C-term)	BP	GK2940	UBE2M (N-term)	BP
GK3520	PRDM1 (BLIMP1)	BP	GK3230	RANBP2 (N-term)	BP	GK2960	USP21 (N-term)	BP
GK3540	PRDM2 (RIZ1)	BP	GR3850	RBBP5	BP	KM4020	ZBRK1 (Center)	BP
GK3550	PRDM2 (RIZ1)	BP	KQ5290	REA	BP	KM4030	ZBRK1 (C-term)	BP
GK2470	PRDM2 (RIZ1) - mouse Mab	BP	KQ7550	REA	BP	KQ6400	ZBTB7 (FBI-1)	BP
GK3530	PRDM2 (RIZ1) (N-term)	BP	KQ5460	REA	BP	KQ8090	ZBTB7 (FBI-1)	BP
GK2450	PRDM3 - mouse Mab	BP	KQ7140	REA - for IHC	BP	KQ6760	ZBTB7 (FBI-1) - abs pack	BP
GK3560	PRDM3 (MDS1/EV11)	BP	KQ5960	RNF40	BP			
GK3570	PRDM4 (PFM1)	BP	KQ4220	RNF40	BP			
GK3580	PRDM5 (PFM2)	BP	KQ5360	RNF40	BP			
GK3590	PRDM6 (PFM3)	BP	KQ3150	RNF40 - for IHC	BP			

BP = blocking peptide available



Other modifications

Protein modifications were once considered to be non-specific ornamentation related to important but mundane roles such as protease resistance. Scientists now know that diverse and dynamic modifications of proteins are crucial to cell physiology and disease. Approximately 5-10% of the genome is estimated to code for enzymes that catalyze protein modification. More than two hundred different protein modifications are known to occur in living cells, and their cellular purposes are under active study by basic researchers and pharmaceutical companies alike. They include **ADP ribosylation, farnesylation, sulfation, palmitoylation, glycosylation, and myristoylation** among many others....

Related antibodies

These antibodies are all rabbit polyclonals

Cat #	Name	Cat #	Name	Cat #	Name
GK9570	ACOX1 (C-term) BP	GK9370	EZH1 (N-term) BP	GK9550	MLP (N-term) BP
GK9560	ACOX1 (N-term) BP	GK9390	EZH2 (Center) BP	GK8910	MPDU1 (Center) BP
GK8440	ADPRH (C-term) BP	GK9380	EZH2 (N-term) BP	GK9510	NMT1 (N-term) BP
GK8430	ADPRH (N-term) BP	GK9680	FACL3 (Center) BP	GK8970	NMT2 (C-term) BP
GK8800	AGER (C-term) BP	GK9670	FACL3 (N-term) BP	GK9520	NMT2 (N-term) BP
GK8790	AGER (N-term) BP	GK9700	FACL4 (Center) BP	GK9330	NYREN18 (C-term) BP
GK8810	AGL (Center) BP	GK9690	FACL5 (N-term) BP	GK9320	NYREN18 (N-term) BP
GK8820	AGL (C-term) BP	GK9720	FACL6 (Center) BP	KM4160	PAPSS1 (Center) BP
KM3880	AGL (N-term) BP	GK9710	FACL6 (N-term) BP	KM4150	PAPSS1 (C-term) BP
GK9350	AOS1 (C-term) BP	GK9050	FDFT1 (Center) BP	KM4140	PAPSS1 (N-term) BP
GK9340	AOS1 (N-term) BP	GK9040	FDFT1 (N-term) BP	KM4170	PAPSS1 (N-term) BP
GK8460	ARF4L (C-term) BP	GK9070	FDPS (Center) BP	KM4050	PAPSS2b (Center) BP
GK8450	ARF4L (N-term) BP	GK9060	FDPS (N-term) BP	GK9740	PPT1 (C-term) BP
GK8480	ARFGAP1 (C-term) BP	GK9100	FNTA (Center) BP	GK9730	PPT1 (N-term) BP
GK8500	ARFGAP3 (C-term) BP	GK9110	FNTA (C-term) BP	GK9760	PPT2 (C-term) BP
GK8470	ARFGAP3 (N-term) BP	GK8990	FNTB (N-term) BP	GK9750	PPT2 (N-term) BP
KM3800	ARL1 (C-term) BP	GK8840	GCNT1 (Center) BP	GK9130	PXF (C-term) BP
GK8490	ARL1 (N-term) BP	GK8850	GCNT1 (C-term) BP	GK9120	PXF (N-term) BP
KM3810	ARL2 (C-term) BP	GK8680	GCS1 (C-term) BP	GK9030	RCE1 (N-term W57) BP
GK8510	ARL2 (N-term) BP	GK8670	GCS1 (N-term) BP	GK9020	RCE1 (N-term) BP
GK8530	ARL3 (C-term) BP	GK8700	GGA1 (C-term) BP	GK9470	RING1 (C-term) BP
GK8520	ARL3 (N-term) BP	GK8690	GGA1 (N-term) BP	GK9460	RING1 (N-term) BP
GK8550	ARL4 (C-term) BP	KM3850	GGA2 (Center) BP	GK8930	RPN1 (C-term) BP
GK8540	ARL4 (N-term) BP	GK8710	GGA2 (N-term) BP	GK8920	RPN1 (N-term) BP
GK8570	ARL5 (C-term) BP	GK8720	GGA3 (C-term) BP	GK8950	RPN2 (C-term) BP
GK8560	ARL5 (N-term) BP	KM3860	GGA3 (N-term) BP	GK8940	RPN2 (N-term) BP
GK8590	ARL6 (C-term) BP	GK9090	GGPS1 (C-term) BP	GK9660	SPTLC1 (C-term) BP
GK8580	ARL6 (N-term) BP	GK9080	GGPS1 (N-term) BP	GK9650	SPTLC1 (N-term) BP
GK8610	ARL7 (C-term) BP	GK9170	GPI8 (C-term) BP	GK9640	SPTLC2 (C-term) BP
GK8600	ARL7 (N-term) BP	GK9160	GPI8 (N-term) BP	GK9630	SPTLC2 (N-term) BP
KM3820	ART1 (Center) BP	GK9190	GPIP137 (C-term) BP	KM4130	SULT1A1 (Center) BP
GK8620	ART1 (N-term) BP	GK9180	GPIP137 (N-term) BP	KM4040	SULT1B1 (C-term) BP
GK8640	ART3 (C-term) BP	GK8860	GPLD1 (N-term) BP	KM4120	SULT1B1 (N-term) BP
GK8630	ART3 (N-term) BP	GK9150	GPLD2 (C-term) BP	KM4070	SULT1C1 (Center) BP
GK8650	ART4 (C-term) BP	GK9140	GPLD2 (N-term) BP	KM4060	SULT1C1 (N-term) BP
KM3830	ART4 (N-term) BP	GK9500	HRX (N-term) BP	KM4180	SULT1C2 (N-term) BP
GK8660	ART5 (C-term) BP	KM3950	ICMT (C-term) BP	KM4090	SULT2A (C-term) BP
KM3840	ART5 (N-term) BP	KM3940	ICMT (N-term) BP	KM4080	SULT2A (N-term) BP
GK9410	BMI (Center) BP	GK3320	ISG15 (C-term) BP	KM4110	SULT2B1a/b (C-term) BP
GK9400	BMI (C-term) BP	GK3310	ISG15 (N-term) BP	KM4100	SULT2B1a/b (N-term) BP
GK9420	CBX (N-term) BP	GK9540	MARCKS (C-term) BP	KM4190	SULT4A1a (C-term) BP
GK9430	CBX4 (C-term) BP	GK9530	MARCKS (N-term) BP	KM4200	SULT4A1a/b (N-term) BP
GK9450	CBX8 (C-term) BP	GK8740	METAP1 (C-term) BP	GK9780	SULT4A1b (C-term) BP
GK9440	CBX8 (N-term) BP	GK8730	METAP1 (N-term) BP	GK8760	TPST1 (C-term) BP
GK9590	CPT1A (C-term) BP	GK8750	METAP2 (C-term) BP	KM3870	TPST1 (N-term) BP
GK9580	CPT1A (N-term) BP	BY4220	METAP2 (N-term) BP	GK8780	TPST2 (C-term) BP
GK9620	CPT1B (C-term) BP	GK8880	MGAT1 (C-term) BP	GK8770	TPST2 (N-term) BP
GK9770	CPT1B (N-term) BP	GK8870	MGAT1 (N-term) BP	KM3900	VNN2 (C-term) BP
GK9610	CPT2 (C-term) BP	GK8900	MGAT2 (C-term) BP	KM3890	VNN2 (N-term) BP
GK9600	CPT2 (N-term) BP	GK8890	MGAT2 (N-term) BP	GK9490	YY1 (Center) BP
GK8830	DDOST (N-term) BP	GK8960	MGAT3 (N-term) BP	GK9480	YY1 (N-term) BP
GK9360	EZH1 (Center) BP	GK8980	MLP (Center) BP	GK9000	ZMPSTE24 (Center) BP
				GK9010	ZMPSTE24 (C-term) BP

BP = blocking peptide available

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