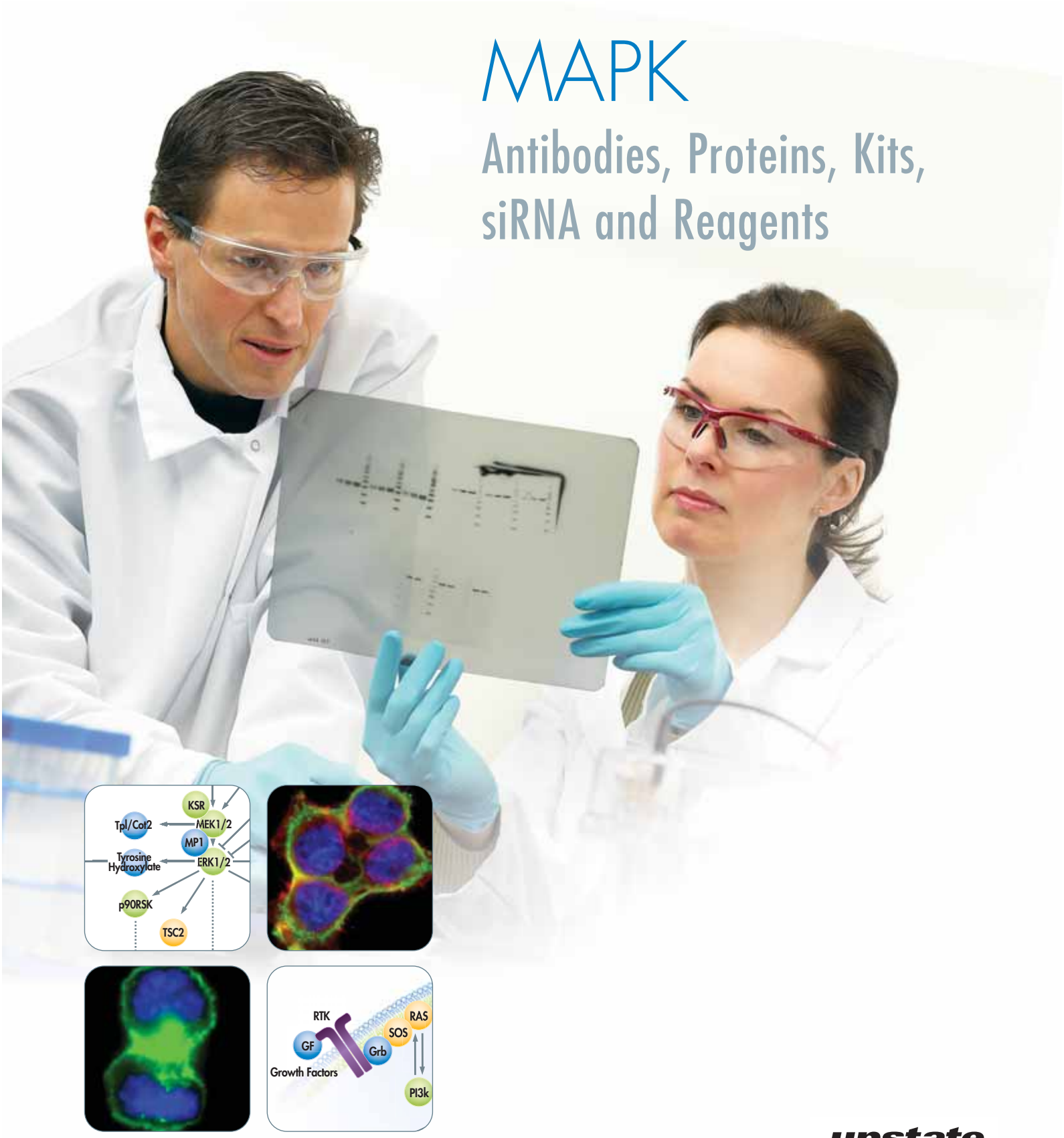
MILLIPORE

MAPK

Antibodies, Proteins, Kits, siRNA and Reagents



upstate
now part of Millipore

MAPK: Antibodies, Proteins, Kits, siRNA and Reagents

MAPK Signaling

- A Brief Review
- Pathways of MAPK

Classical MAPK

- ERK

Stress Induced MAPK

- JNK
- P38

MAPK Signaling Product Listing

- EGFR

Phosphorylation

- Phoshoserine, threonine, and tyrosine, including 4G10® clone

Upstate®, Chemicon® and Linco® are now part of Millipore

The goal of this combined company is to provide more innovative tools, services and application expertise that will improve your productivity. Our first priority is to support your work as a valued partner. Together we now offer:

- **A broader range of products and services** for markets including drug discovery, protein identification, antibody purification, molecular biology, stem cell research, water purification and general filtration.
- **An increased number of applications and protocols** that facilitate your development process.
- **Extended global expertise, leadership and presence** to serve you more effectively.
- **Larger support and research development teams** to deliver innovative products that cost-effectively impact your business.

MAPK

Antibodies, Proteins, Kits, siRNA and Reagents

The Mitogen-Activated Protein Kinase (MAPK) pathways transmit extracellular signals, through receptor tyrosine kinases (RTKs) or integrin stimulation, to both nuclear and cytoplasmic targets. The MAPK signaling cascade transmits and amplifies the signals of extracellular mitogens (growth factors, etc) through the subsequent activation of RTKs. This action creates a signaling cascade of kinases that results in the activation of numerous transcription factors that can permit a cell's entry into the cell cycle.

The MAPKs are comprised of four distinct families that transduce signals in response to numerous stimuli. They include the classical extracellular signal-related kinase 1 and 2 (ERK 1/2) pathway. The stress-related signaling pathways that encompass both the c-Jun N-terminal Kinase/Stress-Activated protein Kinase (JNK/SAPK) and the p38 MAPK pathways. Finally, the fourth MAPK pathway is the ERK5 (BMK1).

MAPKs are activated in a characteristic and highly specific phospho-relay system composed of three kinases (MEKK, MEK, and MAPK) which phosphorylate/activate each other in the cascading fashion described in the first paragraph. Different stimuli activate different MEKKs, which selectively activate their downstream target (MEK), which then ultimately phosphorylates and activates its MAPK.

MAPK is the most well-characterized signaling pathway in research, yet much is still unknown and ongoing studies for its implications in cancer and neurology continue to proliferate. Millipore is at the forefront of this ongoing research, providing complete solutions for active research in both academic and bio/pharma settings.

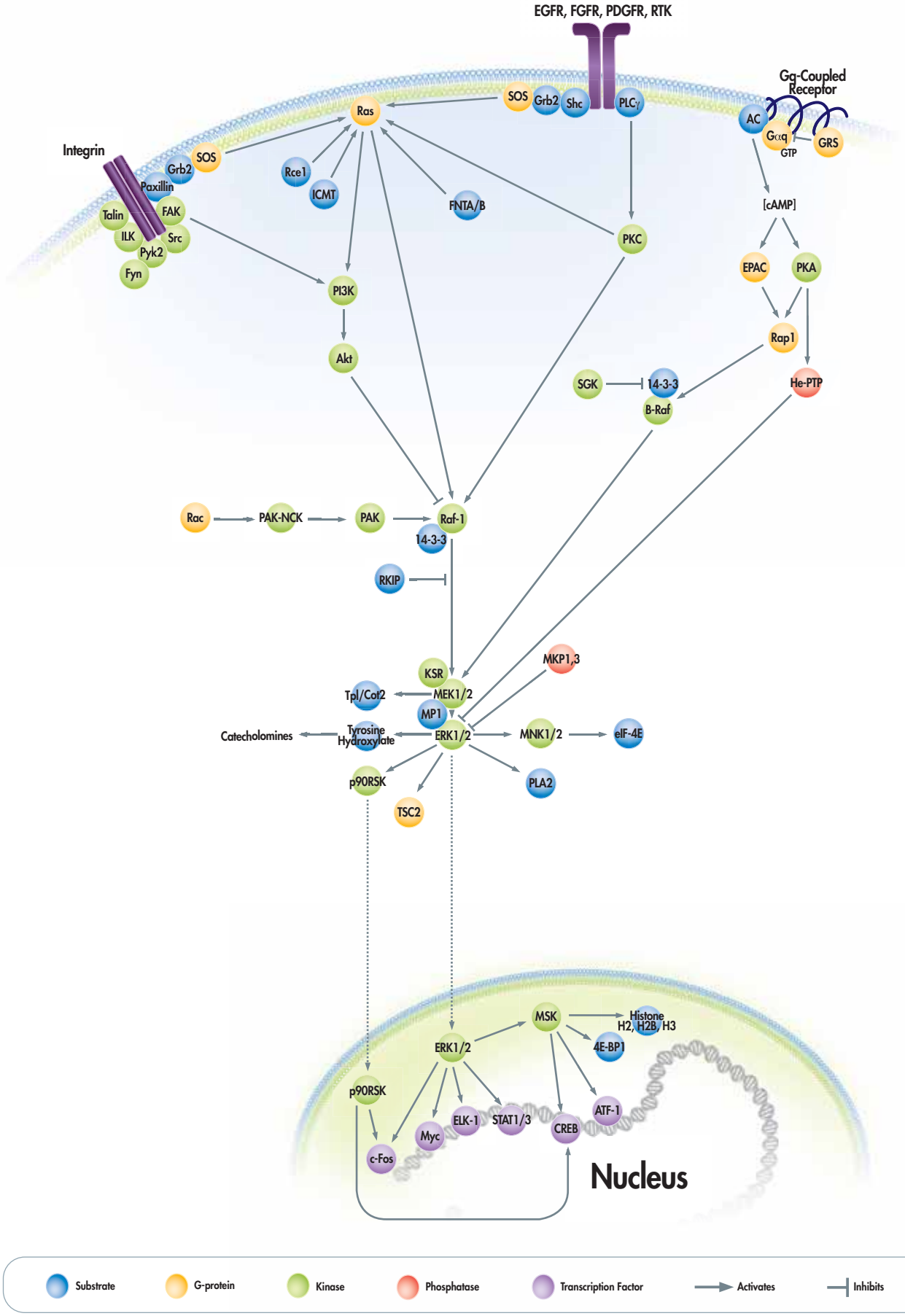
The Pathways of MAPK

The ERK pathway is activated by various growth factors (*i.e.* EGF, FGF, PDGF, VEGF, etc.) and integrin stimulation. The JNK and p38 pathways, also referred to as the stress-related MAPK, are regulated by stress inducing signals such as osmotic stress and UV radiation as well as proinflammatory cytokines such as IL-1 and TNFα. It should be noted that although there is selective stimulation of each of these distinct pathways, there also is a great deal of cross-talk between them. For instance, p38-dependent activation of ERK has been demonstrated.

All of the MAPKs (ERK, JNK, p38MAPK, and ERK5) are activated through phosphorylation on both threonine and tyrosine residues at the Thr-X-Tyr dual phosphorylation motif, where X is Glu, Pro, and Gly for ERK, JNK, and p38, respectively. Once phosphorylated and active, they then go on to phosphorylate downstream targets in both the cytoplasm and the nucleus. One of their main targets of MAPK are transcription factors that are activated via this phosphorylation.

Many malignant cancers are characterized by the deregulation of MAPK signaling cascades. Cancerous cells do not respond to cell signaling that would normally result in cell cycle arrest or apoptosis (programmed cell death). In fact, constitutive MAPK signaling contributes to the evolution of some of the most lethal forms of cancer. In some cancers, MAPK is upregulated and results in the migration and invasion of the cancerous cells. Inhibition of the MAPK expression reduces migration and invasion. Many tumors show an increase, sustained activation of this pathway. This is one reason why the MAPK signaling pathway is a highly sought anti-cancer drug target. Among the cellular activities that MAPKs modulate are cell division, proliferation, survival, differentiation, apoptosis, motility and metabolism.

Millipore is your complete source for the study of MAPK signaling, particularly in these critical areas of disease research and drug discovery. We supply the highest quality cell signaling solutions and compounds available with our industry leading, fully guaranteed Upstate cell signaling products. As your single source provider, Millipore can help boost your productivity leaving more time for the science that is at the heart of your expertise.


EGFR, FGFR, PDGFR, RTK
Gq-Coupled Receptor
Integrin
SOS
Grb2
Shc
PLCγ
Ras
AC
Gαq
GTP
GRS
Paxillin
Talin
FAK
ILK
Src
Pyk2
Fyn
Rce1
ICMT
FNTA/B
[cAMP]
PKC
EPAC
PKA
PI3K
Rap1
Akt
SGK
14-3-3
He-PTP
B-Raf
Rac
PAK-NCK
PAK
Raf-1
14-3-3
RKIP
KSR
MKP1,3
Tpl/Cot2
MEK1/2
MP1
Catecholomines
Tyrosine Hydroxylate
ERK1/2
MNK1/2
eIF-4E
p90RSK
PLA2
TSC2
MSK
Histone H2, H2B, H3
4E-BP1
ERK1/2
p90RSK
ELK-1
STAT1/3
Myc
CREB
ATF-1
c-Fos
Nucleus
Substrate
G-protein
Kinase
Phosphatase
Transcription Factor
Activates
Inhibits

Classical MAPK

The classical, canonical MAPK signaling pathway is an evolutionatily conserved pathway that controls the growth and survival of a large group of human tumors where it is shown to have increased and sustainable activation. Classical MAPK is involved in the control of many fundamental cellular processes that include cell proliferation, survival, differentiation, apoptosis, motility and metabolism. It accomplishes this through the promotion of cell proliferation and the prevention of apoptosis. In a normal cell, the signaling pathway is initiated by the binding of a growth factor, such as EGFR/ERBB, VEGF, PDGF, HGF, and FGF, to its respective receptor. This ligand binding activates RTK that then binds to the growth factor receptor bound protein 2 (Grb2) that subsequently binds to specific phosphorylated residues in the intracellular tail portion of the receptor. SOS (son of sevenless), a guanine nucleotide exchange factor, binds to Grb2 to activate the small G-protein Ras by catalyzing the replacement of GDP to GTP. It is in this GTP-bound active state that Ras activates the kinase activity of the Ser/Thr kinase Raf (MAP Kinase Kinase Kinase). Raf then binds to and activates MEK (MAP Kinase Kinase) by phosphorylating it on the two residue motif. Both of these two proteins - Ras and Raf - are mutated in a large number of human cancers. MEK, a dual kinase (a Ser/Thr and a Tyr kinase), phosphorylates and activates MAPK/ERK on the TxY motif.

The regulation of a large number of cellular processes are dependent upon the activation state of ERK, so controlling this pathway could have profound effects on various diseases. As noted above, many tumors show an increased, sustained activation of this pathway and Raf (BRAF and c-Raf/Raf1), the top kinase in this pathway, is an important modulator of this activity. In addition to stimulating the MEK/ERK pathway, It is widely held that Raf directly antagonizes the death promoting activity of apoptosis signaling-regulating kinase 1. Raf is thought to control apoptosis through two distinct mechanisms in both a MEK dependent and independent manner. In the MEK dependent manner, Raf activates ERK via MEK, which then phosphorylates RSK that leads to the phosphorylation and inactivation of the pro-apoptotic protein BAD and the activation of CREB.

Ras is a heavily studied target of both academic and pharmaceutical research because of its implications in various pathways and diseases, as well as being mutated in a large number of human cancers. In its oncogenic mutated state, Ras is unable to hydrolyze GTP to GDP, thus staying in an active state and activating numerous pathways including the MAPK pathway through its activation of Raf, as well as others such as PI3 Kinase and RalGDS. For this reason it has become a popular drug target.

One path that the pharmaceutical industry has taken is to control Ras and its activity by finding its weakest feature. For its activation, Ras must localize to the plasma membrane, but interestingly, it lacks a transmembrane domain. To activate, Ras must first undergo a post-translational modification (PTM) known as prenylation at its C-terminal CAAX motif where C is a cysteine, the As are alipathic amino acids, and X can be any amino acid. Ras modification occurs in a controlled three step process. The first step in the process is the prenylation of the C in the CaaX motif that is initiated by the covalent attachment of farnesyl groups to the cysteine that is catalyzed by the heterodimer enzymes farnesyl transferases a and b. After this modification, the –aaX of the motif is proteolytically removed via Rce1 (Ras Converting Enzyme 1), a membrane associated endoprotease, by a mechanism that is still not fully understood. Finally, the C-terminal prenylcysteine is now methlylated by ICMT (Isoprenylcysteine Carboxymethyl Transferase). Many Ras targeting drugs have yet to pass clinical trials and their success in treating tumors associated with Ras activation remains unproven.

…20 years of experience backed by the most highly regarded scientific expertise.

Millipore's antibodies and kinases are widely used in drug discovery and our small G-protein kits have become one of the best selling in the market. With more than 20 years of experience backed by the most highly regarded scientific expertise, Millipore is the leader in complete cell signaling solutions.

The Raf family (A-Raf, B-Raf, and Raf1) is another heavily studied drug target because it

influences is so many downstream MAPK pathways. Raf also inhibits apoptosis by binding to and suppressing the activity of the pro-apoptotic kinase ASK1. Raf activates MEK by phosphorylating it on two serine residues. Some of the negative regulators of Raf include Akt and the serum/glucocorticoid inducible kinase. It both negatively and positively regulates large numbers of signaling targets. This development theory reasons that by selecting Raf as a drug target, the drug could inhibit the activity of a number of growth factor stimulations as opposed to a drug that inhibits only one of the growth factor receptors such as EGFR or VEGFR. It is thought that B-Raf might be the predominant activator of MEK and that Raf-1 has a role in protection against apoptosis; a process that does not require its kinase activity or its activation of MEK. This theory was further fueled by the finding of the larger amount of oncogenic BRAF mutations in human cancers.

MEK has also been implicated in a large number of human cancers. The two highly homologous MEK proteins, MEK1 and MEK2, are dual-specific kinases that contain two consensus kinase motifs with one involved in the phosphorylation of Serine/Threonine residues and the other in the phosphorylation of tyrosine residues. MEK's only known substrate is ERK which it subsequently phosphorylates and activates in its TEY motif, phosphorylation sites Tyr185 followed by Thr183, that lay in the ERK activation loop.

The Raf/MEK/ERK pathway is also involved in focal adhesion and migration through its interactions with Paxillin. Paxillin is constitutively associated with MEK, and in response to hepatocyte growth factor (HGF), also recruits and binds activated Raf-1 and inactive ERK. ERK binds to the Src Paxillin phosphorylation site Tyr118. This activates the MAPK signaling pathway specifically in newly forming focal adhesions that results in the ERK phosphorylation of Paxillin Ser83, a site that promotes its binding to FAK and to the downstream activation of Rac.

Stress-Related MAPK Signaling Pathways

Millipore also provides signaling products for the study of stress-related MAPK pathways such as JNK and p38. Stress related pathways are activated by external stressors such as ultraviolet light and osmotic stress.

JNK

c-Jun N-terminal Kinase (JNK) was originally found to be stress-activated. When activated, JNK binds to and phosphorylates a number of transcription factors, most notable Jun, and are thus transcriptional regulators. C-Jun, a member of the AP-1 family of transcription factors, regulates cytokine gene expression. Along these lines, JNK inhibitors may be effective in the control of rheumatoid arthritis (RH), an autoimmune disease involving increased production of inflammatory cytokines. Inhibition of JNK signaling also enhances chemotherapy-induced inhibition of tumor cell growth, suggesting the JNKs may provide a molecular target for the treatment of cancer.

Both JNK and p38 MAPK are often simultaneously activated in response to environmental changes. These two stress kinase signaling pathways have evolved to relay increasingly complex ranges of environmental stimuli. Just as ERK is activated by MEK, JNK is activated by MKK4 and MKK7. Once activated, it is known to phosphorylate a number of downstream targets including the transcription factors c-Jun, ATF-2, and ELK-1.

p38

The p38 MAPK family of Ser/Thr kinase proteins is made up of 4 isoforms, p38α (MAPK14, SAPK2a), p38β (MAPK11, SAPK2b), p38δ (MAPK13, SAPK4), and p38γ (MAPK12, SAPK3). p38α, the first isoform discovered, was identified in LPS stimulated mouse macrophages and was found to have high sequence homology to HOG1 kinase.

The other isoforms share 74 %, 57 %, and 60 % sequence homology with the α isoform, respectively. All four isoforms possess the TGY motif and are activated by the dual phosphorylation of the threonine and tyrosine residues in this motif, which are Thr180/Tyr182 in human p38α. p38, especially the α and β isoforms, are able to phosphorylate a wide array of targets including numerous kinases such as MAPKAP-K2, MAPKAP-K3, PRAK, MSK, and MNK and many transcription factors including STAT1, p53, NFATp, ATF-2, Elk-1 (although weakly), and MEF2a/c. They have traditionally been associated with stress, immune response, and regulation of cell proliferation and apoptosis. They also have a role in regulating the production of pro-inflammatory cytokines and have been associated with diseases such as asthma, rheumatoid arthritis, diabetes, and inflammatory bowel disease. Just as ERK is phosphorylated and activated by MEK, p38α MAP Kinase is activated predominantly by its upstream regulatory kinases MKK6 and MKK3 as well as MKK4 which also activates JNK, but is not a substrate for MKK7 as is JNK.

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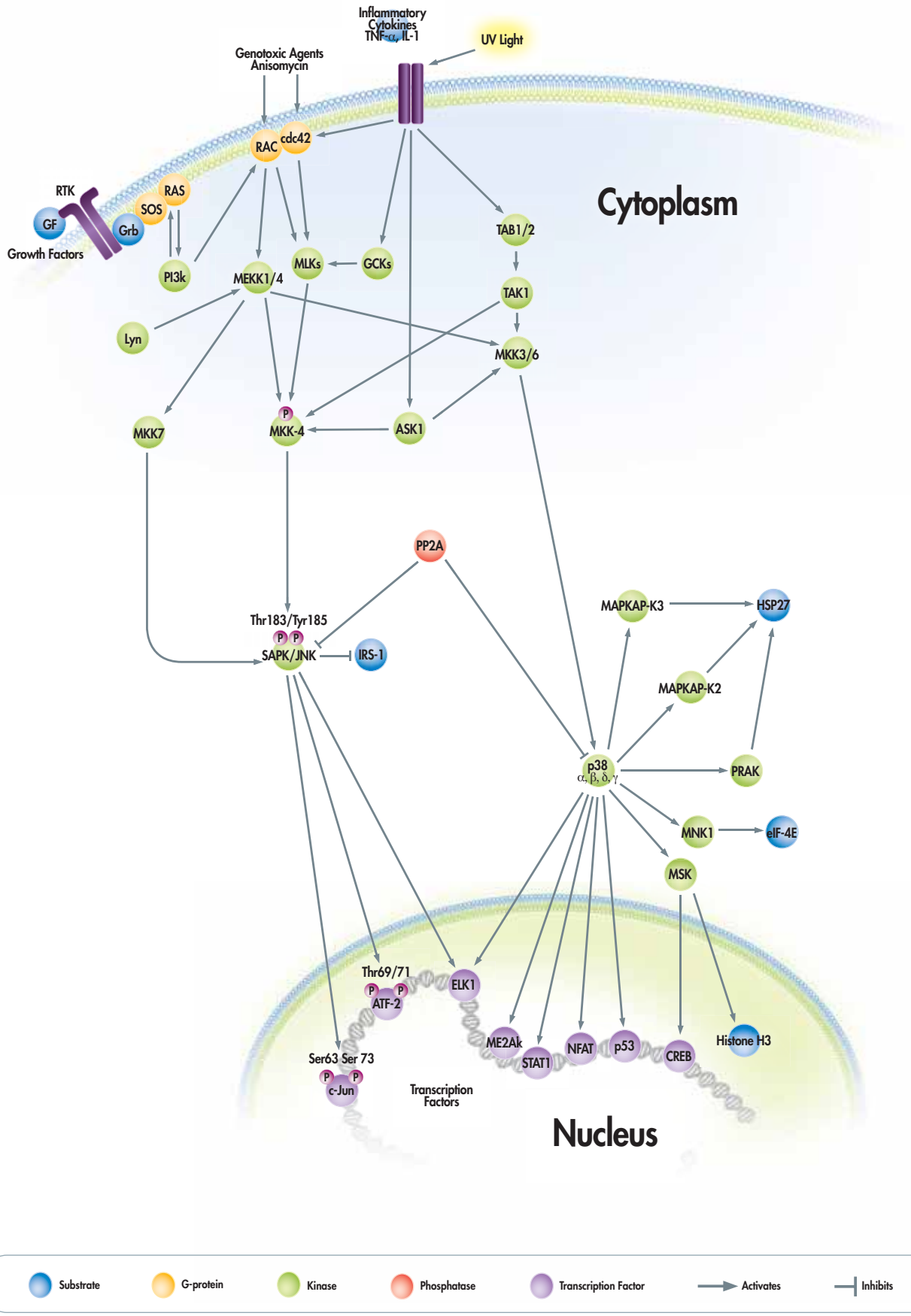
MAPk Overview with Stimuli


Inflammatory Cytokines TNF-α, IL-1
UV Light
Genotoxic Agents Anisomycin
RAC
cdc42
RTK
GF
Growth Factors
Grb
SOS
RAS
PI3k
MEKK1/4
MLKs
GCKs
TAB1/2
TAK1
MKK3/6
Lyn
MKK7
P
MKK-4
ASK1
Cytoplasm
PP2A
Thr183/Tyr185
P P
SAPK/JNK
IRS-1
MAPKAP-K3
HSP27
MAPKAP-K2
p38
α, β, δ, γ
PRAK
MNK1
eIF-4E
MSK
Thr69/71
P P
ATF-2
ELK1
Ser63 Ser 73
P P
c-Jun
Transcription Factors
ME2Ak
STAT1
NFAT
p53
CREB
Histone H3
Nucleus
Substrate
G-protein
Kinase
Phosphatase
Transcription Factor
Activates
Inhibits

MAPK Products

Note: Additional species and applications may apply. For more information, call Tech Support at 800 437 7500.
For international technical service, please look for your local listing in the back of this brochure.

Tested Applications

Abbr.	Description	Abbr.	Description	Abbr.	Description
ABA	Affinity Binding Assay	HDAC	Histone Deacetylase Assay	NEUT	Neutralizing
ACT	Activity Assay	HI	Hemagglutination Inhibition	NT	Nitration
ADH	Stimulates ECM Adhesion	HMT	Histone Methyltransferase Assay	NUEX	Nuclear Extraction
AI	Agonist or Inhibitor	IAP	Immunoaffinity Purification	PA	Phosphatase Assay
AMP	DNA Amplification	IC	Immunocytochemistry (Cells)	PC	Positive Control
APA	Affinity Precipitation Assay	ID	Immunodiffusion	PCU	Protein Clean-up
BD	Beadlyte® Assay	IEP	Immunoelectrophoresis	PD	Protein Determination
CA	Caspase Assay	IF	Immunofluorescence	PIA	Peptide Inhibition Assay
CC	Culture Confirmation	IFIX	Immunofixation	RIA	Radioimmunoassay
ChIP	Chromatin Immunoprecipitation	IH	Immunohistochemistry (Tissue)	RNAi	RNAi/siRNA/Gene Knockdown
CULT	Cell Culture	IH(P)	Immunohistochemistry (Paraffin)	RPA	Ribonuclease Protection Assay
DB	Dot Blot	IND	Induces Function	RT-PCR	Reverse Transcriptase Polymerase Chain Reaction
EA	Enzyme Assay	INHIB	Inhibits Activity/Function	SW	Software Needed
ELISA	Enzyme Immunoassay (ELISA)	IP	Immunoprecipitation	TFX	Transfection
EM	Electron Microscopy	IPK	IP-Kinase Assay	UC	Uncharacterized Antiserum
EMSA	Electrophoretic Mobility Shift Assay	IPX	Immunoperoxidase Staining	WB	Immunoblotting (Western)
FC	Flow Cytometry (FACS)	IRMA	Immuno Radio-Metric Assay	Web*	Important additional product reactivity information available on datasheet
FUNC	Affects Function	IT	Immunotoxin		
GPA	G-Protein Assay	KA	Kinase Assay		
HA	Hemagluttination	LFA	Lateral Flow Assay		
HAT	Histone Acetyltransferase Assay	NB	Northern Blot		

Tested Species Reactivity

Abbr.	Description	Abbr.	Description	Abbr.	Description
A	All Species	Gr	Gerbil	R	Rat
Am	Amphibian	Gs	Ground Squirrel	Rb	Rabbit
As	*Aspergillus*	Gt	Goat	Rc	Raccoon
Av	Avian	H	Human	rH	Recombinant Human Protein
B	Bovine	H-sp	Human Only	Rp	Reptilian
Bab	Baboon	Ht	Hamster	Sal	Salamander
Bact	Bacterial	In	Insect	Seal	Seal
Bat	Bat	Inv	Invertebrates	Sh	Sheep
Ca	Canine (Dog)	Kn	Kangaroo	Shk	Shark
Ch	Chicken	Lg	*Ligia*	SHm	Syrian Hamster
Chp	Chimpanzee	Lz	Lizard	Shp	Shrimp
Crb	Crab	M	Mouse	Sj	*Schistosoma japonicum*
Crf	Crawfish	Ma	Mammals	Sn	Snail
Di	*Dictyostelium*	Md	Mule Deer	Snk	Snake
Dr	*Drosophila*	Mi	Mink	Spd	Spider
Ec	*E. coli* Bacteria	Mk	Monkey	Sqd	Squid
Ech	Echinoderms	Ml	Mollusk	Su	Sea Urchin
Ecl	*Enterobacter cloacae*	Nem	Nematode	T	*Tetrahymena*
Elk	Elk	Nr	*Neurospora crassa*	Vo	Vole
Eq	Equine (Horse)	Op	Opposum	Vrt	Vertebrates
Eu	Eukaryote	Ox	Ox	WR	Most common vertebrate species tested
F	Fish	Pl	Green Plants	Xn	*Xenopus*
Fe	Feline (Cat)	Pm	Primate	Y	Yeast (*S. cerevisiae*)
Fg	Frog	Pn	*Penicillium*	Zf	Zebra Fish
Ft	Ferret	Po	Porcine (Pig)		
Gp	Guinea Pig	Qu	Quail		

14-3-3

The 14-3-3 proteins are a family (at least seven members in mammals) of linkers and adaptors that comprise as much as 1% of total cellular protein. The proteins serve many functions, binding to other cytoplasmic and nuclear proteins through phosphorylated serine or threonine residues in virtually all eukaryotic cells. These binding interactions frequently have regulatory significance in many key cellular processes such as cell cycle progression and apoptosis, cell adhesion, and cell morphology. Aberrations in expression of 14-3-3 isoform expression has been linked to several genetic disorders and to cancer.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-14-3-3 γ	CG31-2B6	H M R	WB	Pur	M IgG_1	100 µg	05-639
14-3-3 Proteins	8C3	R Sh	WB	Asc	M IgG_{2a}	500 µL	MAB3053
Anti-14-3-3 s	CS112-2A8	H M R	WB IP	Pur	M $IgG_{1\kappa}$	200 µg	05-632
Polyclonal Antibody							
Anti-14-3-3 β/ζ		Ma In	WB	Pur	Rb IgG	200 µg	06-351
Anti-14-3-3 ζ/γ/η		WR	WB		Rb IgG	150 µL	06-408
14-3-3 Proteins		R	WB	Serum	Rb	100 µL	AB1671

AP-1 (Jun and Fos)

Fos

Fos is a component of the AP-1 transcription factor (heterodimer with Jun, or Jun homodimer). Whereas Jun is expressed constitutively but activated following phosphorylation, the Fos promoter contains a serum-response element, and Fos is expressed following mitogenic stimulation, with immediate-early kinetics. AP-1 activity thus differs based upon whether or not the cells are activated to express Fos.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-c-fos	CF2	H	IH not IH(P)	Sup	M IgM	100 µL	MAB1283
Anti-Fos		H M	IP WB IC	APur	Rb IgG	100 µg	06-341
Anti-c-fos				APur	Ch	100 µg	AB9116
Anti-c-fos		R	WB IH IH(P) Web*	Pur	Sh	500 µg	AB1584
Anti-c-fos		H R	WB IC	Pur	Sh	100 µg	CBL440
siRNA							
Fos *SMART*pool® siRNA reagent		H	RNAi			5 nmol	M-003265
Fos siRNA/siAb™ Assay Kit		H	WB RNAi			1 kit	60-082
Assay							
c-fos Transcription Factor Assay		H M R	ACT			1 plate	70-545
Jun/Fos Transcription Factor Assay		H M R	ACT			1 plate	70-546
AP-1 Family Transcription Factor Assay Colorimetric		H M R	ACT			2 plates	70-550

Jun

Jun is a component of the transcription factor AP-1, and can constitute AP-1 activity either as a homodimer or as a heterodimer with Fos. By contrast with Fos, Jun is expressed constitutively, and can be activated by phosphorylation of serines 63 and/or 73. These sites are targets for the SAPK1/JNK family of protein kinases, and their phosphorylation states can be monitored using antibodies specific for the phospho-epitopes. In addition, Jun is phosphorylated by GSK-3 on sites which inhibit Jun activity. Since GSK-3 is inactivated by Akt, the Akt pathway results in Jun activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-c-jun	6A6.2	H	WB	Pur	M IgG_{2a}	100 µg	MAB3732
Anti-phospho-c-Jun (Ser73)		H M	WB IC	Pur	Rb IgG	100 µL	05-913
Anti-c-Jun		Av H M	IP WB IC	antiserum	Rb IgG	200 µL	06-225
Anti-phospho-c-Jun (Ser63)		H M R	WB	Pur	Rb IgG	100 µL	06-828
Anti-phospho-c-Jun (Ser73)		H M	IP WB IC	APur	Rb IgG	100 µL	06-659
Anti-phospho-c-Jun (Thr91)		H M	WB	APur	Sh IgG	100 µL	07-568
Anti-phospho-c-Jun (Thr91/Thr93)		H M	WB	APur	Sh IgG	100 µL	07-570
Protein							
c-Jun (1-169)-GST, soluble			KA			100 µg	14-195
siRNA							
c-Jun siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-084
c-Jun *SMART*pool siRNA reagent		H	RNAi			5 nmol	m-003268
Assay							
c-jun Transcription Factor Assay		H M R	ACT			1 plate	sgt540
Jun/Fos Transcription Factor Assay		H M R	ACT			1 plate	sgt546
AP-1 Family Transcription Factor Assay Colorimetric		H M R	ACT			2 plates	sgt550

ASK1 (Apoptosis Signaling-regulating Kinase-1)

Apoptosis Signal-Regulating Kinase 1 (ASK1) is a Ser/Thr protein kinase and a member of the MAPKKK family. ASK1 is a component of stress response signaling and activates the JNK and SAPK signaling pathways.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-ASK1		H	WB	Pur	Rb IgG	200 µg	07-302
Anti-ASK-1, C-terminus		H	WB	Pur	Rb IgG	100 µg	AB16505

ATF-2

The ATF/CREB family of DNA binding proteins consists of transcription factors whose activity is regulated by specific signaling pathways, including the stress/cytokine/radiation inducible pathways that function through SAPK1/JNK activation. Two threonine residues at positions 69 and 71 in the N-terminal region of ATF-2 are essential in mediating adenovirus E1A-inducible transcriptional activation. These residues are efficiently phosphorylated *in vivo* and are excellent substrates for SAPK1/JNK *in vitro*.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-phospho-ATF2 (Thr69/71)	AW65	H M	IP WB	Pur	M IgG_1	200 µg	05-891
Anti-ATF2		H	WB	Pur	Sh IgG	200 µg	06-326
Anti-phospho-ATF2 (Thr69)		H	KA	Pur	Sh IgG	200 µg	36-016
Anti-phospho-ATF2 (Ser90)		H M R	WB	Pur	Sh IgG	200 µg	36-015
Protein							
ATF2 (aa 19-96)			KA			1 mg	12-367
ATF2, biotin conj.			KA			500 µg	12-432
siRNA							
siRNA plasmid, pKD-ATF2-v3			RNAi			5 µg	62-172

BMK/ERK5

Big MAP kinase (BMK1), also known as Erk5, is a member of the MAP kinase family that is activated (phosphorylated on the Thr218 and Tyr220 residues) in cells in response to oxidative stress, hyperosmolarity and treatment with serum. EGF is a potent activator of BMK1, but in contrast to Erk1/2, the EGF-mediated activation of BMK1 occurs independently of Ras and requires Mek5. BMK1 is part of a distinct MAP-kinase pathway involved in EGF-induced cell proliferation and progression through the cell cycle.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-BMK1/Erk5		H M	IP IPK WB	antiserum	Rb IgG	200 µL	07-039
Anti-MEK5		Ca H M Mk R Rb Sh Xn	ELISA IP WB IH	aPur	Rb	50 µg	AB3184
Anti-phospho-BMK1/Erk5 (Thr218/Tyr220)		H M R	WB	APur	Rb IgG	200 µL	07-507

cAMP

Cyclic AMP (cAMP, adenosine 3′, 5′-cyclic monophosphate) is a nucleotide that acts as a key second messenger in multiple signal transduction pathways. It is synthesized from ATP by the action of adenylate cyclase, and is inactivated by hydrolysis to 5′-AMP by the actions of phosphodiesterases. cAMP effects are mediated primarily by cAMP-dependent protein kinase (PKA), result in cAMP being responsible for the regulation of many physiological processes such as metabolism, cell growth and differentiation, gene transcription, ion transport and ion channel function.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-cyclic AMP (cAMP)		A	ELISA RIA IH	Serum	Rb	100 µL	09-176
Anti-cyclic AMP (cAMP)		A	ELISA RIA IH	Serum	Rb	50 µL	AB306
Anti-cAMP		A	RIA	Serum	Rb	1,000 assays	AB505
Assay							
cAMP HTS Immunoassay Kit (Chemiluminescent)			ELISA			192 assays	17-418

Cdc42

cdc42 is a member of the Rho family of small GTP-binding proteins, and plays roles in cytoskeletal Actin organization as well as transformation. Rac is activated downstream of cdc42, or independently by Ras signaling, and in turn Rac stimulates Rho. Activation of cdc42 stimulates filopodia formation, whereas Rac results in the formation of lamellipodia, and Rho stimulates formation of actin stress fibers. Effectors of the cdc42/Rac pathway include NADPH Oxidase (Phox) and the SAPK1/JNK family of kinases. The latter pathway is activated by the PAK kinases, which are direct targets of cdc42.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Cdc42				Pur	M	100 µg	MAB3707
Anti-Rac / Cdc42		B H M R	IP WB	Pur	Rb	50 µg	AB3302
Anti-Cdc42		H M R	WB	Pur	Rb	100 µg	AB4201
Recombinant Protein							
Cdc42, recombinant human full length				Pur	*E. coli*	20 µg	SGT211

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Assay							
cdc42 Activation Assay Kit			ABA			1 kit	17-286
Anti-cdc42 Immunoblotting Kit			WB			1 kit	17-299
Cdc42/Rac Activation Assay						30 assays	SGT445
cDNA							
cdc42 cDNA (wt) in pUSEamp			TFX			5 µg	21-191
cdc42 cDNA (dominant negative) in pUSEamp			TFX			5 µg	21-192
cdc42 cDNA (activated) in pUSEamp			TFX			5 µg	21-197
Protein							
Rac/cdc42 Assay Reagent (PAK1 PBD, agarose)			ABA			300 µg	14-325

Crk

CRKL belongs to a family of adaptor proteins containing SH2/SH3 domains that couple to effector proteins including p130CAS, SOS, Abl, and Arg. CRKL plays a role in the mediation of Integrin- and Rac-dependent cell migration and in Ras-dependent activation of JNK. The protein is also involved in T-cell activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-CrkL	5-6	H	IP WB IH	Pur	M IgG	200 µg	05-414
Polyclonal Antibody							
Anti-CrkL		H	WB	Pur	Rb IgG	200 µg	07-620
Anti-CrkL, NT		H	WB	Pur	Rb IgG	200 µg	07-621
Protein							
Crk (120-225)-GST			KA			500 µg	14-468

CREB

CREB was identified as the transcription factor which binds to cyclic AMP response elements (CRE). Its activity is inducible by phosphorylation, which can be effected by PKA, CaM K IV, and perhaps other protein kinases. Upon activation, CREB dimerizes, binds to DNA, and recruits histone acetyl transferases such as CBP/p300 to chromatin. Phosphorylation state-specific antibodies specific for phospho-serine 133 can provide a surrogate readout of CREB activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-CREB	NL904	H M R	IP WB	Pur	Rb IgG	200 µL	05-767
Anti-phospho-CREB (Ser133)	10E9	H M R	WB	Pur	M $IgG_{1\kappa}$	100 µg	05-667
Anti-phospho-CREB (Ser133	634-2	M R	IF WB IC	Pur	M IgG	200 µg	05-807
Anti-CREB		H M R	ELISA WB	Pur	M IgG_1	100 µg	MAB5432
Polyclonal Antibody							
Anti-CREB		H M	IP WB	Pur	Rb IgG	200 µg	06-863
Anti-phospho-CREB (Ser133)		H Ht M R	EMSA IP WB IH	Pur	Rb IgG	200 µL	06-519
Anti-CREB		H M R	ELISA EMSA IP WB	Pur	Rb	100 µL	AB3006
Anti-CREB, pSer133		H M Mk R	WB	Serum	Rb	100 µL	AB3442
Peptides							
CREB (123-136)			KA			50 µg	12-490
CREB Immunizing Peptide			WB			50 µg	12-377
phospho CREB Immunizing Peptide			WB			50 µg	12-378
siRNA							
CREB *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003619
CREB siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-012
siRNA plasmid, pKD-CREB-v2		H	RNAi			5 µg	62-011
Assay							
CREB Transcription Factor Assay			ACT			1 plate	70-575

Elk

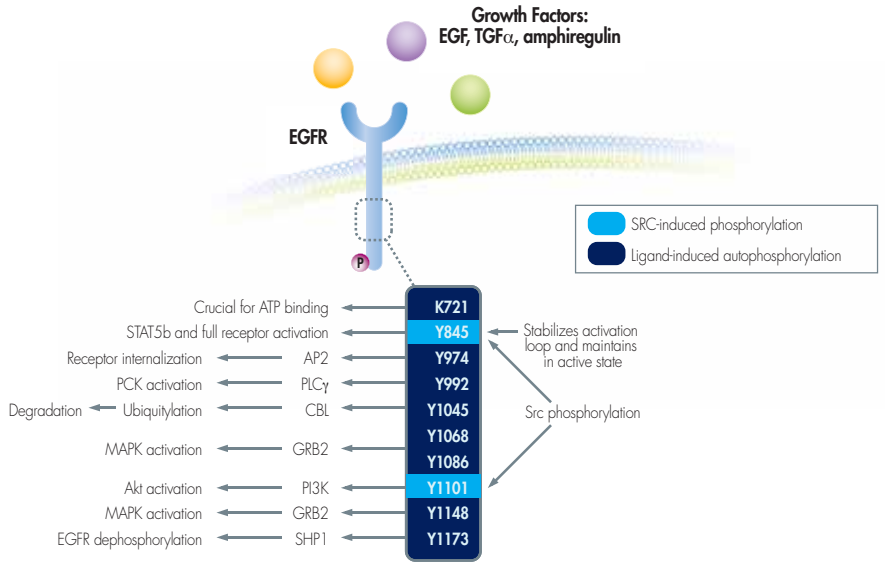
Elk-1 is a member of the ternary complex factor (TCF) family of transcription factors. It is phosphorylated and activated by the MAP kinase pathway in the C-terminal transcription factor domain on Serine 383. This phosphorylation is critical to it activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-ELK-1, phospho-specific (Ser383)		H	WB	APur	Rb	100 µL	AB3809

EGFR

Epidermal growth factor receptor (EGFR) is one of four members of the EGFR family of receptor tyrosine kinases. Signaling through these receptors is induced by binding of EGF to the extracellular domain, which results in receptor homo- and hetero-dimerization, trans- and auto-phosphorylation of tyrosine residues within the cytoplasmic domain and ultimately to the activation of the classical MAPK signaling pathway. EGFR plays a key role in the regulation of essential normal cellular processes and in the pathophysiology of hyperproliferative diseases such as cancer. It is known to be essential for mediation of both proliferative and survival signals to cells. Activation of the EGFR signaling pathway has been linked with increased cell proliferation, angiogenesis, metastasis and decreased apoptosis. EGFR is found in most solid tumors and its autophosphorylation activates the intrinsic kinase activity toward heterologous substrates, as well as creating docking sites for adapter proteins for multiple adapter proteins to bind and nucleate signaling complexes that activate the Ras, PI3 Kinase, and PLC pathways. Many EGFR mutations are directly related to various diseases and thus are the targets of numerous drugs.

Crucial sites for physiological functions



Millipore offers numerous products for the study of EGFR, particularly in the areas of overexpression in malignancies such as lung cancer. For instance, the amino acid substitution L858R is one of several heterozygous mutations that have been identified in Non-Small-Cell Lung Cancer (NSCLC) patients who have clinical responses to the EGFR inhibitor Iressa® preparation. There is some evidence that these mutations result in elevated activity and enhanced sensitivity to Iressa preparation. In patients with tumors bearing Iressa-sensitive mutations, resistant subclones containing an additional EGFR mutation, T790M, emerge in the presence of the drug. It has been shown experimentally that the T790M mutation leads to high-level functional resistance to Iressa preparation. In patients with tumors bearing Iressa-sensitive mutations (eg. L858R, L861Q), resistant subclones containing the T790M mutation emerge in the presence of the drug.

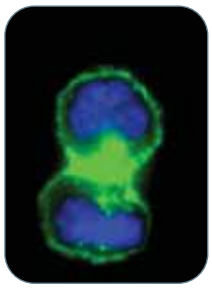
Description	Quantity	Cat. No.
Anti-EGFR, neutralizing	250 µg	05-101
Anti-EGFR	250 µg	05-104
Anti-EGFR, Rb Mab	100 µL	04-338
Anti-EGFR, Rb Mab	100 µL	04-337
Anti-EGFR (aa 1140-1160)	100 µg	04-287
Anti-EGFR (extracellular domain)	100 µg	04-289
Anti-EGFR (C-Terminus)	100 µg	04-290
Anti-phospho-EGFR (Thr654)	100 µg	04-282
Anti-phospho-EGFR (Thr669)	100 µg	04-281
Anti-phospho-EGFR (Tyr845)	100 µg	04-283
Anti-phospho-EGFR (Tyr1045)	100 µg	04-284
Anti-phospho-EGFR (Ser1047)	100 µg	04-280
Anti-phospho-EGFR (Tyr1068), RbMab	100 µL	04-339

Description	Quantity	Cat. No.
Anti-phospho-EGFR (Tyr1068)	100 µg	04-285
Anti-phospho-EGFR (Tyr1086)	100 µL	04-340
Anti-phospho-EGFR (Tyr1086)	100 µg	04-286
Anti-phospho-EGFR (Tyr1173), Rb Mab	100 µL	04-341
Anti-phospho-EGFR (Tyr1173)	50 µg	05-483
Anti-EGFR (non-phospho-Tyr1173)	50 µg	05-484
Anti-Epidermal Growth Factor	200 µL	MAB126
Anti-EGF Receptor, intracellular, activated	100 µg	MAB3052
Anti-EGFR, extracellular, EGF binding site	50 µg	MAB88910
Anti-EGFR, N-terminal	100 µg	CBL416
Anti-EGFR, N-terminal	100 assays	CBL416F
Anti-EGFR, Cytosolic	100 µg	CBL417
Anti-EGFR, Cytosolic	100 assays	CBL417F

EGF/EGFR (erbB-1) (Epidermal Growth Factor Receptor)

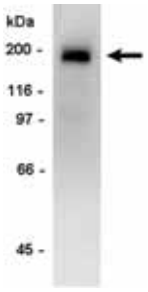
EGF exerts its signals through the EGF Receptor and its hetero-oligomerization partners, members of the ErbB family. The Receptors are transmembrane tyrosine kinases which are activated as a consequence of ligand-induced dimerization. Every EGF molecule has two receptor-binding sites, so the activated ligand-receptor complex consists of two molecules of EGF and two receptor molecules. Receptor autophosphorylation activates the intrinsic kinase activity towards heterologous substrates, as well as creating docking sites for adapter proteins to bind and nucleate signaling complexes that activate the Ras, PI3 Kinase, and PLC pathways. Overexpression of the EGF Receptor is typical in most solid tumors.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-EGFR, neutralizing	LA1	H	IP WB IC NEUT	Pur	M IgG_1	250 µg	05-101

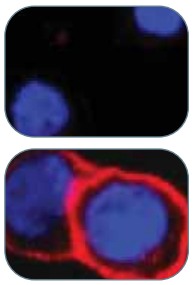


Immunofluorescence Analysis
Left: A431 cells were stained with 2 µg/mL of anti-EGF Receptor (neutralizing), clone LA1, Alexa Fluor 488 conjugate (green) and DAPI (blue).

Immunoblot Analysis
Right: Non-reduced A431 cell lysate probed with anti-EGF Receptor (1 µg/mL)

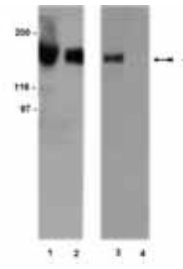


Anti-EGFR	LA22	H	IP WB IC	Pur	M IgG_{2a}	250 µg	05-104
Anti-EGFR, Rb Mab		H	WB IP IC FC		Rb IgG	100 µL	04-338
Anti-EGFR, Rb Mab		H	WB ELISA		Rb IgG	100 µL	04-337
Anti-EGFR (aa 1140-1160)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-287
Anti-EGFR (extracellular domain)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-289
Anti-EGFR (C-Terminus)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-290
Anti-phospho-EGFR (Thr654)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-282
Anti-phospho-EGFR (Thr669)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-281
Anti-phospho-EGFR (Tyr845)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-283
Anti-phospho-EGFR (Tyr1045)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-284
Anti-phospho-EGFR (Ser1047)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-280
Anti-phospho-EGFR (Tyr1068), RbMab		H	WB ELISA		Rb IgG	100 µL	04-339
Anti-phospho-EGFR (Tyr1068)		H	WB ELISA		M $IgG_{1\kappa}$	100 µg	04-285
Anti-phospho-EGFR (Tyr1086)		H	WB ELISA		Rb IgG	100 µL	04-340
Anti-phospho-EGFR (Tyr1086)		H	WB ELISA		M IgG1k	100 µg	04-286
Anti-phospho-EGFR (Tyr1173), Rb Mab		H	WB IP IF IH(P)		Rb IgG	100 µL	04-341
Anti-phospho-EGFR (Tyr1173)	9H2	H M	IP WB FC IF		M IgG1k	50 µg	05-483



Immunofluorescence Analysis
Left: A431 cells were untreated (Top) and treated (Bottom) with EGF then stained with 2 µg/mL of anti-phospho-EGFR (Tyr1173), clone 9H2, Alexa Fluor 555 conjugate (red) and DAPI (blue).

Immunoblot Analysis
Right: 20 micrograms of EGF-stimulated (lanes 1 and 3) and unstimulated (lanes 2 and 4) HFF cell lysate was probed with Anti-EGF Receptor (Cat. No. 06-129, lanes 1 and 2) or Anti-phospho-EGFR (Tyr1173), clone 9H2 (lanes 3 and 4) at 0.5 µg/mL.



Anti-EGFR (non-phospho-Tyr1173)	20G3	H M	IP WB		M $IgG_{1\kappa}$	50 µg	05-484
Anti-Epidermal Growth Factor	144-8	H M	IP IH	SPur	M IgG_1	200 µL	MAB126
Anti-EGF Receptor, intracellular, activated	74	H	ELISA WB IC IH	Pur	M IgG_1	100 µg	MAB3052
Anti-EGFR, extracellular, EGF binding site	EGFR-1	H	ELISA FC IP RIA IH INHIB	Pur	M IgG_1	50 µg	MAB88910
Anti-EGFR, N-terminal	EGFR1	H	FC IP IC	Pur	M IgG_{2b}	100 µg	CBL416
Anti-EGFR, N-terminal	EGFR1	H	FC IF	FITC	M IgG_{2b}	100 assays	CBL416F

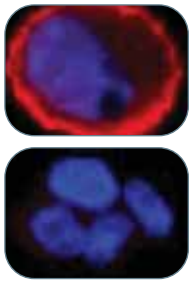
Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-EGFR, Cytosolic	F4	Eq H	ELISA IP WB IC IH IH(P)	Pur	M IgG_1	100 µg	CBL417
Anti-EGFR, Cytosolic	F4	Eq H	IC IH IH(P)	FITC	M IgG_1	100 assays	CBL417F
Anti-c-erbB-1, a.a. 580-591	C11	H	WB IH(P)	Pur	M IgG_1	100 µg	CBL754
Polyclonal Antibody							
Anti-EGF, neutralizing		M	WB NEUT		Rb IgG	1 mg	06-102
Anti-EGFR		H M R Ca Ch	IP WB IC IH		Sh IgG	200 µg	06-129
Anti-EGFR		H M	IP WB		Rb IgG	200 µg	06-847
Anti-Epidermal Growth Factor		H	RIA IH	Serum	Rb	100 µL	AB1910
Anti-phospho-EGFR (Tyr845)		H	WB IF IHC,	APur	Rb IgG	100 µL	07-820
Anti-phospho-EGFR (Tyr992)		H	WB	APur	Rb IgG	100 µL	07-821
Anti-phospho-EGFR (Tyr1069)		H	WB IP	APur	Rb IgG	100 µL	07-715
Anti-phospho-EGFR (Tyr1086)		H	WB	APur	Rb IgG	100 µL	07-818
Anti-phospho-EGFR (Tyr1148)		H	WB	APur	Rb IgG	100 µL	07-819
Antibody Conjugates							
Anti-EGFR, neutralizing, Alexa Fluor® 488 Conjugate	LA1	H	FC WB IC NEUT	Pur	M IgG_1	125 µg	16-246
Anti-EGFR, neutralizing, Alexa Fluor 555 Conjugate	LA1	H	FC WB IC NEUT	Pur	M IgG_1	125 µg	16-247
Anti-phospho-EGFR (Tyr1173), Alexa Fluor 488 Conjugate	9H2	H M	FC IF		M $IgG_{1\kappa}$	25 µg	16-244
Anti-phospho-EGFR (Tyr1173), Alexa Fluor 555 Conjugate	9H2	H M	FC IF		M $IgG_{1\kappa}$	25 µg	16-245
Kinase							
EGFR, active						10 µg	14-531
EGFR (L858R), active						10 µg	14-626
EGFR (L861Q), active						10 µg	14-627
EGFR (T790M), active						10 µg	14-725
EGFR (T790M, L858R), active						10 µg	14-721
Growth Factor							
EGF, culture grade			CULT			100 µg	01-101
EGF, receptor grade			CULT			100 µg	01-102
EGF, human recombinant			CULT			100 µg	01-107
EGF			CULT			500 µg	01-407
Epidermal Growth Factor, mouse tissue culture grade				SPur		100 µg	EA140
Epidermal Growth Factor, recombinant human				Pur		500 µg	GF001
Epidermal Growth Factor, recombinant mouse				Pur		500 µg	GF123
cDNA							
EGFR cDNA (wt) in pUSEamp			TFX			5 µg	21-176
siRNA							
EGFR siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-015
EGFR *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003114

erbB-2/HER2

v-ErbB was identified as the viral counterpart of the EGF Receptor, and its relatives have adopted this nomenclature (or the HER nomenclature for human proteins). These proteins are activated by Heregulin, Neuregulin, and Amphiregulin. All the family members are capable of heterodimerization, and together activate downstream signaling pathways. erbB-2/HER-2/neu is amplified in highly aggressive breast cancers. ErbB-3 has a natural "substitution" in an invariant Lys residue in the ATP-binding site. It is therefore inactive as a kinase, and can only become phosphorylated by heterodimerization with another erbB-family member. All members of this family, when Tyr-phosphorylated, can nucleate the formation of signaling complexes through adapter proteins.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-erbB2 (intracellular domain aa 860-880)		H	WB ELISA		M IgG	100 µg	04-291
Anti-erbB2 (phospho-Ser 1113)		H	WB ELISA		M IgG	100 µg	04-292
Anti-erbB2 (phospho-Thr 686)		H	WB ELISA		M IgG	100 µg	04-293
Anti-erbB2 (phospho-Tyr 1112)		H	WB ELISA		M IgG	100 µg	04-294
Anti-erbB-2/HER-2		H M R MK	WB IP IH	Pur	Rb IgG	200 µg	06-562

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-phopsho-erbB-2/HER-2 (Tyr1248)		H R	WB FC IC	APur	Rb IgG	100 µL	06-229



Immunofluorescence Analysis
Left: 2 µg/mL of this lot showed positive immunostaining for phospho-erbB2/HER-2 in EGF treated A431 cells.

Immunoblot Analysis
Right: Lysates from non-stimulated (lane 1) and heregulin-stimulated (lane 2) MCF-7 cells were probed with Anti-phospho-Erb B2/HER-2 (Tyr1248) (1:2000 dilution).

Anti-phopsho-erbB-2/HER-2 (Tyr1248), Alexa Fluor 488 Conjugate		H R	FC IC	APur	Rb IgG	100 µg	16-235
Anti-phopsho-erbB-2/HER-2 (Tyr1248), Alexa Fluor 555 Conjugate		H R	FC IC	APur	Rb IgG	50 µg	16-236
Anti-c-erbB-2	CB11	H	IH(P)	Sup	M IgG1	200 µL	MAB1282
Anti-c-erbB-2		H R	WB IH	Pur	Sh	100 µg	AB1368
erbB-2 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-016
erbB-2 SMARTpool siRNA reagent		H	RNAi			5 nmol	M-003126

erbB-3/HER3

Monoclonal Antibody

Anti-erbB-3/HER-3	2F12	B H M R	IP WB IH		M $IgG_{2a\kappa}$	200 µg	05-390
Anti-erbB-3/HER-3	H3.105.5	H M	IP NEUT		M IgG_1	100 µg	05-471
Anti-c-erbB-3	RTJI/2E11	H	IP WB IH(P)	Pur	M IgM	100 µg	MAB4021
Anti-c-erbB-3, cytoplasmic domain	RTJ2	H	ELISA IP WB IH	Pur	M IgG_1	100 µg	MAB4023
Anti-c-erbB-2, a.a. 1238-1255	N3/D10	H	FC WB IC IH(P)	Pur	M IgG_1	100 µg	CBL755
Anti-c-erbB-2, extracellular domain	300G9	H	IP WB IH IH(P)	Pur	M IgG1	100 µg	CBL772
Anti-c-erbB-3	SGP.1	H	ELISA FC IP IH not WB not IH(P)	Pur	M IgG_1	100 µg	MAB406

Polyclonal Antibody

Anti-phospho-erbB-2/HER-2 (Tyr1248)		H	WB		Rb IgG	100 µL	06-229
Anti-erbB-2/HER-2		H M Mk R	IP WB IH	Rb IgG	200 µg	06-562	
Anti-erbB-4/HER-4		H	IP WB		Rb IgG	200 µg	06-572

erbB-4/HER4

v-ErbB was identified as the viral counterpart of the EGF Receptor, and its relatives have adopted this nomenclature (or the HER nomenclature for human proteins). These proteins are activated by Heregulin, Neuregulin, and Amphiregulin. All the family members are capable of heterodimerization, and together activate downstream signaling pathways. erbB-2/HER-2/neu is amplified in highly aggressive breast cancers. ErbB-3 has a natural "substitution" in an invariant Lys residue in the ATP-binding site. It is therefore inactive as a kinase, and can only become phosphorylated by heterodimerization with another erbB-family member. All members of this family, when Tyr-phosphorylated, can nucleate the formation of signaling complexes through adapter proteins.

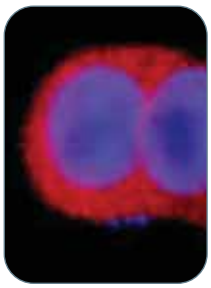
Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-erbB-4/HER-4	H4.72.8	H	FC IP NEUT		M IgG_{2a}	100 µg	05-478
erbB-4 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-080
erbB-4 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003128
Anti-c-erbB-4	HFR1/2G4	H	IP WB IH(P)	Pur	M IgG_{2b}	100 µg	MAB4025

Erk/MAP Kinase

MAP Kinases, or Erks, are Ser/Thr kinases which phosphorylate PXS/TP motifs in many different proteins, and are activated principally in response to mitogenic stimulation. MAP Kinases comprise MAP kinase 1/Erk1, or p44 MAP kinase, and MAP kinase 2/Erk2, or p42 MAP kinase. Both are activated by MEK1 or MEK2, by dual phosphorylation of a threonine and tyrosine residue in the activation loop (TEY motif). Either phosphorylation alone can induce an electrophoretic mobility shift, but both are required for activation of the kinase. This dual phosphorylation is efficiently detected by phosphorylation state-specific antibody directed to the pTEpY motif. No known mutations exist which can lead to constitutive activation of MAP kinases. Once activated, MAP kinases phosphorylate a broad spectrum of substrates, including cytoskeletal proteins, translation regulators, transcription factors, and the Rsk family of protein kinases.

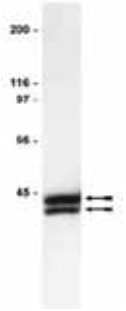
Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-MAP Kinase 2/Erk2	1B3B9	Av H M R	IP WB	Pur	M IgG_{2a}	200 µg	05-157

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-phospho-MAP Kinase1/2 (Erk 1/2)	12D4	Av H M R	IP WB	Pur	M $IgG_{1\kappa}$	50 µg	05-481
Anti-phospho-MAP Kinase 1/2 (Erk1/2) (Thr185/Tyr187)	AW39	H R	BD WB	Pur	Rb IgG	100 µL	05-797
Anti-MAP Kinase 1/Erk 1, CT		M R	IPK WB	Pur	Rb IgG	100 µL	05-957
Polyclonal Antibody							
Anti-MAP Kinase 1/2 (Erk1/2), CT		Av H M R Sh Xn Ech	IP WB IC	APur	Rb IgG	100 µg	06-182



Immunofluorescence Analysis
Left: 2 µg/mL of this lot showed positive immunostaining for MAP kinases in A431 cells.

Immunoblot Analysis
Right: NIH 3T3 cell lysate probed with anti-MAP Kinase 1/2 (0.5 µg/mL).



Anti-MAP Kinase 2/Erk2		H M R	IP WB	Pur	Rb IgG	200 µg	06-333
Anti-phospho-MAP Kinase1/2 (Erk1/2) (Tyr180), polyclonal		H M R	IP WB	APur	Sh IgG	100 µg	06-642
Anti-phospho-MAP Kinase1/2 (Erk1/2)		H R WR	WB	Pur	Rb IgG	200 µg	07-467
Anti-ERK1/2		H M R B Ch Dr Sh Xn Ech Ml	ELISA IP WB IC	Pur	Rb	50 µg	AB3053
Anti-ERK1		B H M Po R Rb	ELISA IP WB	APur	Rb	100 µg	AB3189
Anti-ERK1/2, phospho-specific (Thr202/Tyr204)		H M R Xn	WB	APur	Rb	100 µL	AB3826
Antibody Conjugate							
Anti-MAP Kinase 1/2 (Erk1/2), agarose			IAP IP			50 µg	16-111
Assay							
MAP Kinase/Erk Assay Kit			KA			1 kit	17-133
MAP Kinase/Erk Sampler Pack			KA			1 kit	17-171
MAP Kinase/Erk Assay Kit, non-radioactive			KA			1 kit	17-191
MAP Kinase/Erk Immunoprecipitation Kinase Assay Kit, non-radioactive			KA			1 kit	17-192
MAP Kinase (ERK1/2) Activity Assay			ACT			1 plate	SGT415
MAP Kinase/Erk Substrate Cocktail I			KA			1 mL	20-115
MAP Kinase/Erk Substrate Cocktail II			KA			1 mL	20-166
MAP Kinase 2/Erk2 cDNA (wt) in pUSEamp			TFX			50 µg	21-112
MAP Kinase 1/Erk1 KinEASE™ FP Fluorescein Green Assay			KA			1 kit	32-044
MAP Kinase 2/Erk2 KinEASE FP Fluorescein Green Assay			KA			1 kit	32-045
MAP Kinase 1/Erk1 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-124
MAP Kinase 2/Erk2 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-125
Protein							
MAP Kinase 2/Erk 2 (K52R), inactive			KA			100 µg	14-696
MAP Kinase 1/Erk1 agarose, unactive			KA			250 µg	14-121
MAP Kinase 2/Erk2, active			KA			10 µg	14-550
MAP Kinase 1/Erk1, active			KA	Pur		10 µg	14-439
MAP Kinase 2/Erk2, unactive			KA	Pur		50 µg	14-198

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
siRNA							
MAP Kinase 1/Erk2 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-029
siRNA plasmid, pKD-MAP Kinase 1/Erk2-v1		H M	RNAi			5 µg	62-046
siRNA plasmid, pKD-MAP Kinase/Erk1-v4		H	RNAi			5 µg	62-149
siRNA plasmid, pKD-MAP Kinase 1/Erk2-v5			RNAi			5 µg	62-191
siRNA plasmid, pKD-MAP Kinase/Erk1-v3			RNAi			5 µg	62-192
MAP Kinase 1/Erk2 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003555

FGF

Fibroblast Growth Factors (FGFs) are mitogens for a wide variety of fibroblast and epithelial cells. They signal through receptor tyrosine kinases of the FGF Receptor (FGFR) family. The extracellular portions of these receptors have Ig-like loops, and mutations occurring in these loops have been associated with developmental disorders. Disruption of disulfide bonds in the Ig-loops allows for adjacent receptor molecules to form inter-molecular disulfide bonds, dimerizing the receptor and activating it in the absence of ligand. FGF-2 (basic FGF) is a potent inducer of angiogenesis, and acts by stimulating VEGF expression in endothelial cells.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-FGF-2/basic FGF	bFM-1 (neutralizing)	B H M R	RIA NEUT		M $IgG_{1\kappa}$	500 µg	05-117
Anti-FGF-2/basic FGF	bFM-2	B H M R	RIA WB IH		M $IgG_{1\kappa}$	500 µg	05-118
Anti-FGFR1	19B2	H R	IP WB		M IgG_1	250 µg	05-149
Anti-Fibroblast Growth Factor basic		H	IF WB	Pur	M IgG_1	150 µg	MAB120
Anti-Fibroblast Growth Factor Receptor	VBS1	H M R B Ch	ELISA IP WB IH(P) INHIB	Pur	M IgM	100 µg	MAB125
Polyclonal Antibody							
Anti-Fibroblast Growth Factor basic		H	ELISA WB	Pur	Rb	100 µg	AB1435
Anti-Fibroblast Growth Factor basic		Ma	WB IC IH(P)	Serum	Rb	100 µL	AB1458
Anti-Fibroblast Growth Factor basic		Ma	WB IC IH(P)	Serum	Rb	100 µL	AB1459
Anti-Fibroblast Growth Factor basic		H M R	IH	Serum	Sh	100 µL	AB5396
Anti-Fibroblast Growth Factor basic		H M R	IH	APur	Sh	50 µg	AB5396P
Protein							
FGF-2 / basic FGF, human recombinant			CULT			25 µg	01-106
FGF-2/basic FGF, carrier-free			CULT			25 µg	01-114
FGF-1/acidic FGF, human recombinant			CULT			25 µg	01-116
FGF-7/KGF, human recombinant			CULT			10 µg	01-118
Fibroblast Growth Factor basic peptide, Synthetic, brain derived (1-24)				Pur		1 mg	FA011
Fibroblast Growth Factor acidic, recombinant human				Pur		50 µg	GF002
Fibroblast Growth Factor basic, recombinant human				Pur		50 µg	GF003
Fibroblast Growth Factor-4, recombinant human				Pur		25 µg	GF098

FNTA/FNTB (Farnesyl Transferase a and b subunits)

Many membrane-associated proteins must undergo a complicated post-translational processing in the endoplasmic reticulum in order to become active. This processing occurs on a c-terminal CAAX motif in members of the Ras/Rho family of G-Proteins, the γ subunit of heterotrimeric G-Proteins, and nuclear Lamin. The first step in processing is prenylation (farnesylation by Farnesyl Transferase) of the Cys residue. Prenylated proteins are then cleaved (by Rce1 protease) to remove the amino acids following the prenylated cysteine. The last step in processing is methylation of the neo-c-terminus of the prenylated protein by Icmt (Isoprenylcysteine carboxylmethyltransferase). The enzymes involved in this process are thought to be targets for development of new anti-cancer drugs.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-Farnesyl Transferase α subunit (FNTA)	2418	H	WB	Pur	M IgG_1	100 mL	04-470
Anti-Farnesyl Transferase β subunit (FNTB)		H	WB	APur	Rb IgG	100 mL	09-121

Fos

see AP-1 above

Fyn

Fyn is a Src-family non-receptor tyrosine kinase. It is involved in T-cell and B-cell activation as well as in keratinocyte differentiation. In T-cells, Fyn associates with the T-cell Receptor and Thy-1. Lck and Fyn localize to different cellular regions, suggesting that these two members of the Src family regulate different aspects of T-cell activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-Fyn	1S	H M R	WB IP IPK IH	Pur	M $IgG_{1\kappa}$	100 µg	05-436
Anti-Fyn, Rb Mab		H M R	IF WB IH(P)	Serum	Rb IgG	100 µL	04-353

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-Fyn		Av H M R	IP WB	antiserum	Rb IgG	250 µL	06-133
Anti-Fyn		H M	IP WB	Serum	Rb	50 µL	AB1378
Protein							
Fyn, active			KA			10 µg	14-441
Fyn, partially Pured			KA			300 mU	14-107
siRNA							
Fyn *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003140
Fyn siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-050
siRNA plasmid, pKD-Fyn-v3		H	RNAi			5 µg	62-087
siRNA plasmid, pKD-Fyn-v6		H	RNAi			5 µg	62-088
Assay							
Fyn KinEASE FP Fluorescein Green Assay			KA			1 kit	32-069
Fyn KinEASE FP-645nm FarRed Assay			KA			1 kit	32-149
General Reagents							
Assay Dilution Buffer I (ADBI)			KA			1 mL	20-108
Assay Dilution Buffer II (ADBII)			KA			1 mL	20-111
Magnesium/ATP Cocktail			KA			1 mL	20-113
Phosphate-Citrate Buffer, 5X						8 mL	20-143
Assay Dilution Buffer, 5X			KA			1 mL	20-145
Mg2+ Lysis/Wash Buffer, 5X			GPA			18 mL	20-168
Protein Phosphatase Dilution Buffer			PA			1 mL	20-169
100X GTPγS, 10mM			GPA			50 µL	20-176
100X GDP, 100mM			GPA			50 µL	20-177
pNPP Ser/Thr Assay Buffer			PA			20 mL	20-179
pNPP Tyr Assay Buffer			PA			20 mL	20-180
Tris Assay Dilution Buffer, 10X			KA			1 mL	20-181
Kinase Assay Blocking Buffer			KA			10 mL	20-189
TBS, 20X						50 mL	20-190
10% BSA in TBS			KA			10 mL	20-191
Kinase Assay Clearing Buffer			KA			10 mL	20-193
Dithiothreitol, 1M						450 µL	20-265
1M $MgCl_2$						500 µL	20-303
50mM AMP						50 µL	20-304
10mM ATP						300 µL	20-306
0.5M EDTA, pH 7.2						2 mL	20-307
10X Detection Buffer						3 mL	20-308

Grb2

Growth Factor Receptor Binding proteins (GRB) associate with activated receptor tyrosine kinases through their SH2 domains. GRB1 is more commonly known as PI3 Kinase p85. GRB2 is an adapter protein which recruits other proteins such as the Ras GEF SOS. Other GRB proteins include GRB7, and GRB10.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-GRB2	3F2	B H Ht M R	WB IH	Pur	M $IgG_{1\kappa}$	100 µg	05-372
Anti-GRB2 (C-term)		H	WB		Rb IgG	100 µL	04-358
Anti-Grb2	2GB04	B H M R Xn	IF IH(P)	Pur	M IgG_1	100 µg	MAB1127
GRB2, agarose conj.			IP WB			100 µg	14-128

Heregulin

Heregulin α and β are members of the Neuregulin family of ligands for Erb B or HER family receptor tyrosine kinases. Heregulin-β is a specific ligand for HER-3 and HER-4, though HER-2 also becomes activated as a result of heregulin stimulation, likely by hetero-oligomerization with HER-4. *In vivo*, Heregulin promotes differentiation of mammary epithelial cells into secretory lobuloalveoli, a process involving Rab3A, which is activated by heregulin stimulation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Heregulin-β, EGF Domain			CULT			100 µg	01-201
Anti-Heregulin-1 precursor		H M	WB	Pur	Rb IgG	200 µg	07-494
Anti-Herstatin	CW001	H	WB IH		M IgG	200 µg	05-582
Herstatin Detection Kit (ELISA based)			ELISA			1 kit	17-354

I

CMT

Icmt (Isoprenylcysteine carboxylmethyltransferase) methylates the cleaved form of Ras/Rho small G-protein family members and nuclear Lamin. Methylation is part of the required post-translational modification (prenylation by FT, cleavage by Rce1, methylation by Icmt) required for these proteins to become active.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-Isoprenylcysteine Carboxymethyl Transferase (ICMT)		H	WB	APur	Rb IgG	100 mL	09-119

ILK

Integrin-Linked Kinase (ILK) is a 59 kDa Ser/Thr kinase with four Ankyrin-like repeats. It was cloned from a human placental cDNA library using the yeast two-hybrid system and the cytoplasmic domain of β1 Integrin as bait. The association of ILK and β1 Integrin has been reported *in vivo*. The kinase activity appears to be reduced following Integrin activation, and overexpression of p59ILK inhibits cellular adhesion to Integrin substrates.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
ILK		H M R	WB IP IPK IF	APur	Rb IgG	100 µg	06-592
ILK cDNA (hyperactive) in pUSEamp			TFX			5 µg	21-185
ILK cDNA (inactive, R211A) in pUSEamp			TFX			5 µg	21-182
ILK cDNA (inactive, S343A) in pUSEamp			TFX			5 µg	21-183
ILK cDNA (wt) in pUSEamp			TFX			5 µg	21-184
ILK siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-116
ILK *SMART*pool siRNA reagent			RNAi			5 nmol	M-004499
ILK	65.1.9	H M R	WB IP IC	Pur	M IgG_{2b}	200 µg	05-575

IGF and IGF Receptor

IGF-I and -II signal through the IGF-I Receptor, which is homologous to the Insulin Receptor. The high-affinity IGF-II Receptor does not play a direct role in signaling, but regulates the concentration of free IGF-II. The IGFs are involved in skeletal growth, and are essential for prevention of apoptosis. Serum levels of free IGFs are kept low by the action of IGF binding proteins (IGFBPs), which sequester the IGFs. Overexpression of IGFBPs may induce apoptosis, presumably by reduction of free IGF; IGFBP levels are also altered in some cancers. The IGF-I Receptor is not as mitogenic as some other growth factor receptors, but its ability to activate the PI3 Kinase pathway, through the Insulin Receptor Substrate (IRS) proteins, is critical for mediating cell survival.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Growth Factor Protein							
IGF-II			CULT			25 µg	01-142
IGF-I (resistant to IGFBPs)			CULT			25 µg	01-189
IGF-I			CULT			25 µg	01-208
IGF-I, biotin conj.			WB	HPLC		2 µg	01-212
Insulin-like Growth Factor-I, recombinant human				Pur		100 µg	GF006
Insulin-like Growth Factor-II, recombinant human				Pur		50 µg	GF007
Insulin-like Growth Factor-I, recombinant mouse				Pur		50 µg	GF121
Monoclonal Antibody							
Anti-IGF-II	S1F2	H R	ELISA WB IC NEUT		M IgG_1	500 µg	05-166
Anti-IGF-I	Sm1.2	Av H M R	IP WB IH NEUT		M $IgG_{1\kappa}$	200 µg	05-172
Anti-IGF-IR	JBW902	H M	IP WB IH	Pur	M IgG_{2a}	200 µg	05-656
Anti-phospho-IGF-IR (Tyr1131)/InsR (Tyr1158)	JY202	H M	IP WB	Pur	M $IgG_{2b\kappa}$	200 µg	05-694
Anti-Insulin-like Growth Factor-I Receptor, α-Subunit	24-31	H	IP IH(P)	Pur	M IgG_1	100 µg	MAB1120
Anti-Insulin-like Growth Factor-I Receptor, α-Subunit exon 7/8	24-57	H Rb	INHIB	Pur	M IgG_1	100 µg	MAB1122
Anti-Insulin-like Growth Factor-I Receptor, β-Subunit	1-2	H R	WB	Pur	M IgG_{2b}	100 µg	MAB1123
Anti-Insulin-like Growth Factor-I	M23	H	IH(P)	Pur	M IgG_1	100 µg	CBL52
Anti-Insulin-like Growth Factor-II	W2H1	H	ELISA RIA IH	Pur	M IgG_1	100 µg	CBL82
Polyclonal Antibody							
Anti-IGFBP-1		H	IP WB IC	antiserum	Rb IgG	200 µL	06-106
Anti-IGFBP-2		H M R B Eq Gt Po	IP WB IC	antiserum	Rb IgG	200 µL	06-107
Anti-IGFBP-3		H	IP WB	antiserum	Rb IgG	200 µL	06-108
Anti-IGFBP-4		B H M Po	IP WB	antiserum	Rb IgG	200 µL	06-109
Anti-IGFBP-5		H R	IP WB	antiserum	Rb IgG	200 µL	06-110
Anti-IGF-IRα subunit		H M	IP WB IC		Ch IgY	250 µg	06-429
Anti-IGFBP-1		M R	IP WB	Pur	Rb IgG	200 µg	06-580
Anti-Insulin-like Growth Factor-I		H	ELISA WB	Pur	Rb	100 µg	AB1437
Anti-Insulin-like Growth Factor-II		H	ELISA WB	Pur	Rb	100 µg	AB1438

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-Insulin-like Growth Factor-I		M	ELISA WB NEUT	APur	Gt	50 µg	AB2131P
Anti-Insulin-like Growth Factor Binding Protein 6				APur	Ch	100 µg	AB9148
Anti-Insulin-like Growth Factor-1 Receptor, α-Subunit		H	IP WB	Pur	Rb	100 µg	CBL257
IGFBP-3			ABA			5 µg	12-131
Assay							
CpG WIZ® H19-IGF2 Amplification Kit		H				25 assays	S7842
IGF-IR KinEASE FP Fluorescein Green Assay			KA			1 kit	32-070
IGF-IR KinEASE FP-645nm FarRed Assay			KA			1 kit	32-150
siRNA							
siRNA plasmid, pKD-IGF-IR-v2		H	RNAi			5 µg	62-114
siRNA plasmid, pKD-IGF-IR-v1		H	RNAi			5 µg	62-115
IGF-1R *SMART*pool siRNA reagent			RNAi			5 nmol	M-003012
Protein							
IGF-IR (δ1-958), active			KA			20 µg	14-465
IGF-IRtide						1 mg	12-527
IGFBP-3			ABA			5 µg	12-131

Insulin and Insulin Receptor

The Insulin Receptor (IR) is synthesized as a single polypeptide, which is subsequently cleaved to generate an extracellular α-chain and a transmembrane and intracellular β-chain, tethered together by disulfide bonds. The β-chain has multiple tyrosine phosphorylation sites, including three autophosphorylation sites at its activation loop. The overall structure of the IR is highly homologous to the IGF-I Receptor, except in their c-termini, where the two proteins diverge somewhat. The IR signals primarily by phosphorylating the Insulin Receptor Substrate (IRS) family of proteins, which creates docking sites for SH2-domain containing proteins. Insulin signaling is highly dependent on the PI3 Kinase pathway and Akt, which appear to mediate the functions of insulin.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Recombinant Growth Factor							
Insulin (Arg-Insulin)			CULT			10 mg	01-207
Incelligent™ SG, recombinant human				Pur		1 g	4502-01
Incelligent AF, recombinant human				Pur		1 g	4506-01
Monoclonal Antibody							
Anti-Insulin	MAB 1	H	ELISA RIA	Pur	M IgG_1	1 mg	CBL71
Anti-Pro-Insulin C Peptide	C-PEP-01	H	IH	Pur	M IgG_1	1 mg	CBL94
Anti-Insulin Receptor, α subunit	47-9	B H Po Sh not M not R	INHIB not IP not WB	Pur	M IgG_1	100 µg	MAB1137
Anti-Insulin Receptor, α subunit, azide free	47-9	B H Po Sh not M not R	INHIB not IP not WB	Pur*	M IgG_1	100 µg	MAB1137Z
Anti-Insulin Receptor, α subunit	83-7	B H Po Rb Sh	ELISA FC KA IH(P) not WB	Pur	M IgG_1	100 µg	MAB1138
Anti-Insulin Receptor, β subunit, C-terminus	CT-3	H M Mk R	ELISA KA WB IH(P)	Pur	M IgG_1	100 µg	MAB1139
Polyclonal Antibody							
Anti-Insulin Receptor, β subunit		H M	IP WB	APur	Rb IgG	100 µL	07-724
Anti-phospho-IR (Tyr972)		H M	WB	APur	Rb IgG	100 µL	07-838
Anti-phospho-IR/IGF1R (Tyr1158)		H	WB IC IH	APur	Rb IgG	100 µL	07-839
Anti-phospho-IR/IGF1R (TyrpY1162/1163)		H	WB IC IH	APur	Rb IgG	100 µL	07-840
Anti-phospho-IR/IGF1R (Tyr1158/Tyr1162/Tyr1163)		H M	WB	APur	Rb IgG	100 µL	07-841
Anti-Insulin		B H Po	WB IH	Serum	Gp	1 mL	AB3440
Anti-Insulin		H	ELISA WB	APur	Ch	100 µg	AB3455
Anti-Insulin Receptor B, exon 11		H	RIA	Pur	Rb	100 µg	CBL245
Anti-Insulin Receptor, C-terminus		H	IP WB	Pur	Rb	100 µg	CBL258
Assay							
Insulin R KinEASE FP-645nm FarRed Assay			KA			1 kit	32-151
Insulin R KinEASE FP Fluorescein Green Assay			KA			1 kit	32-071
Protein							
Insulin Receptor, active			KA			10 µg	14-466

IRSp53

IRSp53 is a recently identified substrate for the Insulin Receptor tyrosine kinase which is predominantly expressed in mammalian brain and is involved in guidance of the neuronal growth cone. At least five isoforms resulting from alternative splicing have been found; splicing produces proteins with alternative c-terminal sequences that modulate subcellular localization. IRSp53 contains a CRIB motif that allows it to bind and activate the small G-Protein cdc42, an SH3 domain that couples it to actin. when overexpressed, IRSp53 causes extensive formation of filopodia.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-IRSp53		H M R	WB	Serum	R IgG	100 µL	07-786

JIP (JNK Interacting Protein)

JIP, JNK Interacting protein, is a scaffolding protein that binds to JNK. It was originally identified as cytoplasmic inhibitor of JNK. It is also known to bind to MAP Kinase Kinase 7, MKP7, and members of the MLK family. It is believed to be essential for JNK activation in certain cell types including neurones.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-JIP1					M IgG	100 µg	04-481
Anti-phospho-JIP1							
JIP2							04-482

JNK/SAPK

The JNK/SAPK1 kinases, like the other MAPK-like kinases, are thought to phosphorylate multiple substrates and regulate many processes, including proliferation (in some cell types) and apoptosis. The SAPK2/3 family is widely referred to as the p38 family. These kinases are activated by stresses, most notably inflammatory cytokines, irradiation, and certain toxins such as anisomycin, and arsenite. The activating kinases of SAPK2/3 are SKK2/MEK3 for SAPK2a and 2b, and MKK6 for SAPK3. The targets of the SAPK2/3 family include the MAPKAP kinases 2 and 3/3pK. In addition, SKK4 is related to this family, exhibiting 60% identity, and is activated by MKK6.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-JNK2		H M R	WB ELISA	APur	M IgG	100 µg	05-986
Anti-JNK3/SAPK1b	C05T	H R	WB	Pur	M IgG	100 µL	05-893
Polyclonal Antibody							
Anti-JNK/SAPK1		H M R	IP WB	Pur	Rb IgG	200 µg	06-748
Anti-phospho-JNK (Thr183/Tyr185, Thr221/Tyr223)		H M R	IP WB	Pur	Rb IgG	200 µg	07-175
Anti-JNK1		M R	IP KA	Pur	Sh	250 µg	AB4081
Anti-JNK2		H M R	ELISA WB not IP	Serum	Rb	50 µL	AB8910
siRNA							
JNK2/SAPK1a siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-099
siRNA plasmid, pKD-JNK2a2/SAPK1a-v1		H	RNAi			5 µg	62-097
siRNA plasmid, pKD-JNK2a2/SAPK1a-v5		H M	RNAi			5 µg	62-098
JNK2 *SMART*pool siRNA		H	RNAi			5 nmol	M-003515
Protein							
JNK1a1/SAPK1c, active			KA			10 µg	14-327
JNK1a1/SAPK1c, unactive			KA			50 µg	14-328
JNK2a2/SAPK1a, active			KA			10 µg	14-329
JNK3/SAPK1b, active			KA			10 µg	14-501
JNK3/SAPK1b, unactive			KA			50 µg	14-523
JNK3/SAPK1b (K55R), inactive, Streptavidin Binding Peptide			KA			200 µg	13-126
JNK3tide						1 mg	12-528
MKK6/SKK3, active			KA			10 µg	14-303

Jun

see "AP-1" above

LIMK

The Actin cytoskeleton undergoes extensive changes during cell morphogenesis and motility. Rho, the small GTPase, is involved with regulating these processes. LIM Kinase 1 phosphorylates the Actin-depolymerizing factor, Cofilin, thus regulating Actin cytoskeletal reorganization. It appears that LIM Kinase 1 is activated by Rho and its downstream protein kinase ROK (Rho-associated Kinase).

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-LIM Kinase 1		H M	WB	Pur	Rb	100 µg	ab3814
Anti-phospho-LIMK 1/2 (Tyr507/Thr508)		H	WB	APur	Rb IgG	100 µL	07-850
Protein							
LIM Kinase 1, active			KA			10 µg	14-656

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
LIM Kinase 1, active, mouse			KA			15 µg	14-457
LIM Kinase 1, unactive			KA			50 µg	14-659
siRNA							
siRNA plasmid, pKD-LIM Kinase 1-v2			RNAi			5 µg	62-256
siRNA plasmid, pKD-LIM Kinase 1-v3			RNAi			5 µg	62-257
AdenoSilence™ RNAi Kit LIMK1		H	RNAi			3 vials	GAL10103
AdenoSilence RNAi Virus LIMK1-v1		H	RNAi			500 µL	GAL10103-V1
AdenoSilence RNAi Virus LIMK1-v2		H	RNAi			500 µL	GAL10103-V2
AdenoSilence RNAi Virus LIMK1-v3		H	RNAi			500 µL	GAL10103-V3
AdenoSilence RNAi Kit LIMK2		H	RNAi			3 vials	GAL10104
AdenoSilenc RNAi Virus LIMK2-v1		H	RNAi			500 µL	GAL10104-V1
AdenoSilence RNAi Virus LIMK2-v11		H	RNAi			500 µL	GAL10104-V11
AdenoSilence RNAi Virus LIMK2-v2		H	RNAi			500 µL	GAL10104-V2

MAPKAP Kinase

MAPKAP Kinases are Ser/Thr kinases activated by phosphorylation by the SAPK2/3, or p38 family of stress-activated kinases. MAPKAP Kinase 2 and 3 phosphorylate substrates with the sequence H-X-R-X-X-S where H is any hydrophobic residue, including CREB (Ser 133) and HSP27. MAPKAP kinases are similar to Rsk kinases, which are activated by mitogen-signaling pathways, rather than stress-signaling pathways.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
MAPKAP Kinase Substrate Peptide			KA			1 mg	12-240
Rsk3, active			KA			10 µg	14-462
Rsk4, active			KA			10 µg	14-702

Rsk1 (MAPKAP Kinase 1a)

Rsk1, Rsk2, and Rsk3 are Ser/Thr kinases which are activated by MAP Kinases, and are alternatively referred to as MAPKAP kinases 1a, 1b, and 1c. Following activation, Rsk isoforms translocate to the nucleus, where Rsk2 phosphorylates Ser10 of Histone H3, a critical step in the stimulation of immediate-early gene expression. Rsk1 is able to phosphorylate Ser133 of CREB, activating it as a transcription factor. Rsk1 activation can be monitored by phosphorylation state specific antibodies directed against sites involved in its activation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
RSK1 (N-term)							04-417
Rsk1 Phospho (pT359/pS363)							04-419
Rsk1 Phospho (pS380)							04-418
Anti-Rsk1/MAPKAP Kinase 1a		H M R	IP WB		Rb IgG	100 µg	06-668
Anti-phospho-Rsk1/MAPKAP Kinase 1a (Thr359)			WB		Rb IgG	100 µL	07-526
Anti-phospho-Rsk1/MAPKAP Kinase 1a (Ser363)		H M R	WB		Sh IgG	100 µg	06-824
Anti-Rsk1		H M R	ELISA IP WB	APur	Rb	100 µg	AB3190
siRNA plasmid, pKD-Rsk1/MAPKAP Kinase 1a-v5		H	RNAi			5 µg	62-106
Rsk1/MAPKAP Kinase 1a siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-052
Rsk1/MAPKAP Kinase 1a *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003025
protein							
S6 Kinase/Rsk Substrate Peptide 1			KA			2 mg	12-124
Rsk1/MAPKAP Kinase 1a, active			KA			10 µg	14-479
Rsk1/MAPKAP Kinase 1a, active			KA			10 µg	14-509
Rsk2/MAPKAP Kinase 1b, active			KA			10 µg	14-480
siRNA							
Rsk1/MAPKAP Kinase 1a *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003025

Rsk2 (MAPKAP Kinase 1b)

Antibody							
Rsk2 (C-term)							04-420
Rsk2 (N-term)							04-421
Anti-Rsk2/MAPKAP Kinase 1b		H M R	IP WB		Rb IgG	100 µg	06-918
siRNA							
siRNA plasmid, pKD-Rsk2/MAPKAP Kinase 1b-v4		H	RNAi			5 µg	62-109
siRNA plasmid, pKD-Rsk2/MAPKAP Kinase 1b-v5		H	RNAi			5 µg	62-110
Rsk2/MAPKAP Kinase 1b siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-100
Rsk2/MAPKAP Kinase 1b *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003026

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
MAPKKAP-K2							
Antibody							
Anti-MAPKAPK2	7H4.2	H	IP WB	Pur	M IgG	100 µg	04-539
Anti-phospho-MAPKAPK2		H	WB	Pur	M IgG	100 µg	05-1016
Anti-phospho-MAPKAP Kinase 2 (Thr222)		H Ht M Rb	KA WB		Rb IgG	200 µg	07-155
Anti-MAPKAP Kinase 2, long form		H M	WB		Rb IgG	100 µg	07-241
Anti-MAPKAP Kinase 2, agarose conj.			ELISA WB		Rb IgG	200 µL	16-203
MAPKAP Kinase 2 Immunoprecipitation Kinase Assay Kit, non-radioactive			KA			1 kit	17-297
siRNA							
siRNA plasmid, pKD-MAPKAP Kinase 2-v1		H M R	RNAi			5 µg	62-143
siRNA plasmid, pKD-MAPKAP Kinase 2-v4		H	RNAi			5 µg	62-144
Rsk2/MAPKAP Kinase 1b *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003026
MAPKKAP-K3							
Antibody							
Anti-MAPKAP Kinase 3 (3pK)		H	IP		Sh IgG	100 µg	06-601
siRNA plasmid, pKD-Rsk1/MAPKAP Kinase 1a-v3		H	RNAi			5 µg	62-125

MBP

Myelin Basic Protein is a widely used substrate for the assay of several protein kinases, including MAP kinase and PKC. MAP kinase phosphorylates a single site on MBP (Thr98), and the extent of phosphorylation of this site can be monitored by use of a phosphorylation state-specific antibody, providing the basis of a non-radioactive assay for MAP kinase activity.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-phospho-MBP	P12	WR	KA WB	Pur	M IgG	100 µg	05-429
Anti-MBP	SKB3	H M R	WB	Pur	M $IgG_{1\kappa}$	50 µg	05-675
Anti-phospho-MBP	BK403	WR	WB	Pur	M $IgG_{1\kappa}$	200 µg	05-705
Anti-phospho-MBP	BK403		WB	Pur	M $IgG_{1\kappa}$	1 mg	05-705MG
Antibody Conjugate							
Anti-phospho-MBP, HRP conj.			ELISA KA WB			50 µL	16-198
Anti-phospho-MBP, HRP conj.						50 µL	16-206
Protein							
MBP (myelin basic protein), bovine, Pured			KA			10 mg	13-104
MBP, Dephosphorylated			KA			5 mg	13-110
MBP, biotin conj.			KA			1 mg	13-111
Assay							
MBP Assay Kit, 96-well, Chemiluminescence Detection			KA			1 kit	17-353
MBP Coated Microplate, 96 Well			KA			2 plates	30-011
KinEASE FP Fluorescein Green Assay - Module 2 - MBP (Thr98) Kinases			KA			1 kit	32-002
KinEASE FP-645nm FarRed Assay Module 2 - MBP (Thr98) Kinases			KA			1 assay	32-005

MEK

MAP Kinase/Erk Kinase (MEK), alternatively known as MKK, is a true dual-specificity kinase, in that it phosphorylates the MAP kinases on both the Thr and Tyr of the activation motif TEY. *In vitro*, the tyrosine phosphorylation is favored, whereas *in vivo* both phosphorylation events appear to occur simultaneously. This suggests that an additional factor is present in cells to facilitate the reaction. MEK1 and MEK2 are activated by phosphorylation of two serine residues (Ser218/222 in MEK1 and Ser222/226 in MEK2), which are substrates for the Raf family of kinases. Mutation of the phosphorylation sites from Ser to Asp creates a protein with constitutive kinase activity, which when expressed in cells is able to cause transformation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-phospho-MEK1 (Ser218/222)/MEK2 (Ser222/226)		H M R	WB	Pur	Rb IgG	100 µL	05-747
Anti-MEK1, NT	C12T	Ca H M Mk R Rb	IP WB	Pur	Rb IgG	100 µL	05-925
Anti-MEK1 CT, Rb Mab		H R	FC IP WB IC IH(P)	Serum	Rb IgG	100 µL	04-376
Anti-MEK2 NT, Rb Mab		H R	FC IP WB IC IH(P)	Serum	Rb IgG	100 µL	04-377

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-phospho-MEK1 (Ser298)		H M R	WB	APur	Rb IgG	200 µL	07-339
Anti-phospho-MEK1 (Ser218/222)/MEK2 (Ser222/226)		H M R	WB	Pur	Rb IgG	200 µg	07-461
Anti-MEK1		H M R	IP IPK WB	Pur	Rb IgG	200 µg	07-641
Anti-phospho-MEK1 (Thr292)		H M	WB	APur	Rb IgG	100 µL	07-852
Anti-phospho-MEK1 (Thr386)		H M R	WB	APur	Rb IgG	100 µL	07-853
Anti- phospho-MEK2 (Thr394)		H	WB	APur	Rb IgG	100 µL	07-854
Anti-phospho-MEK2 (Thr394)		M R	WB	APur	Rb IgG	100 µL	07-855
Anti-phospho-MKK3/6 (Ser189/Thr193)/ (Ser207/Thr211)		H	WB	APur	Rb IgG	100 µL	07-856
Anti-phospho-MKK4 (Ser257/Thr261)		H	WB	APur	Rb IgG	100 µL	07-857
Anti-phospho-MKK7 (Ser271/Thr275)		H M	WB	APur	Rb IgG	100 µL	07-858
Anti-MEK1, N-terminus		H M R Xn	IP WB IH	Pur	Rb	50 µg	AB3183
Anti-MEK5		Ca H M Mk R Rb Sh Xn	ELISA IP WB IH	APur	Rb	50 µg	AB3184
Anti-MKK6		H M R Xn	IP WB	Pur	Rb	50 µg	AB3185
Anti-MEK1/2, phospho-specific (Ser218/222)		H	WB	APur	Rb	100 µL	AB3810
Anti-MEK1/2, phospho-specific (Ser218/222)		H	WB	APur	Rb	25 µL	AB3810-25UL
Anti-MEK1, phospho-specific (Thr386)		H M	WB	APur	Rb	100 µL	AB4209
Anti-MEK1, phospho-specific (Thr292)		H M	WB	APur	Rb	100 µL	AB4210
Assay and cDNA							
MEK1 Assay Kit			KA			1 kit	17-157
MEK1 cDNA (wt) in pUSEamp			TFX			5 µg	21-106
MEK1 cDNA (wt) in pUSEamp			TFX			5 µg	21-107
MEK1 cDNA (activated) in pUSEamp			TFX			5 µg	21-119
MEK1 cDNA (activated) in pUSEamp			TFX			5 µg	21-120
siRNA							
MEK1 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-096
siRNA plasmid, pKD-MEK1-v2		H M R	RNAi			5 µg	62-152
MEK1 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003571
Protein							
MEK1 (6His), unactive			KA			50 µg	14-706
MEK1, active			KA	Pur		10 µg	14-429
MEK1, active, rabbit			KA			10 µg	14-206
MEK1 (K97R), inactive			EA			50 µg	14-737
MEK1, unactive			KA			50 µg	14-420
MEK1, unactive, rabbit			IPK KA	Pur		50 µg	14-205
MEK2, active			KA			10 µg	14-528
MEK2 (K101M), inactive			KA			50 µg	14-709
MEK2, unactive			KA			25 µg	14-541
MEK2, unactive			KA			50 µg	14-532

MEKK

MEKK1 (Mitogen-Activated Protein Kinase Kinase Kinase 1 or MAP3K1) mediates the responses to a number of metabolic and mitogenic signals and is involved in JNK-mediated apoptosis (MEKK1 seems to have an anti-apoptotic role). MEKK1 also exhibits E3 Ubiquitin Ligase activity towards Erk2. MEKK3 (MAP3K3) regulates the activity of MEK5 and BMK1/Erk5 during growth factor-induced cellular stimulation. BMK1 (Big Mitogen-Activated Protein Kinase, aka Erk5) is a member of the MAP Kinase family whose cellular activity is elevated in response to growth factors, oxidative stress, and hyperosmolar conditions. MEKK3 regulates BMK1 activity through its regulation of MEK5 activity. MEKK3 may also regulate NFκB-dependent gene transcription.

Antibody							
Anti-MEKK1		H M R	WB not IP	APur	Rb	50 µg	AB3186
Anti-MEKK2 CT, Rb Mab		H not M not R	FC IP WB IC IH(P)	Pur	Rb IgG	100 µL	04-378
Anti-MEKK3		H M R	WB		Rb IgG	100 µL	07-691
Anti-MEKK3 (N-term)		H	WB		Rb IgG	100 µL	04-379
Protein							
MEKK1, active			KA	Pur		10 µg	14-196
siRNA							
siRNA plasmid, pKD-MEKK2-v1			RNAi			5 µg	62-260

MKK

Members of the p38 Mitogen-Activated Protein Kinase family are activated by treatment of cells with cytokines and by exposure to environmental stress. The effects of these stimuli on p38 MAP Kinase are mediated by the MAP Kinase Kinases (MKKs) MKK3, MKK4, and MKK6. Studies have shown that knocking out MKK3 protein expression causes defects in the response of fibroblasts to the proinflammatory cytokine TNF. MKK3 appears to be a critical component of a TNF-stimulated signaling pathway that causes increased expression of inflammatory cytokines.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
MKK3							
Antibody							
Anti-MKK3 NT, Rb Mab		H	FC IP WB	Pur	Rb IgG	100 µL	04-381
siRNA plasmid, pKD-MKK3-v3			RNAi			5 µg	62-261
siRNA plasmid, pKD-MKK3-v4			RNAi			5 µg	62-262
siRNA plasmid, pKD-MKK3-v4			RNAi			5 µg	62-262
siRNA plasmid, pKD-MKK3-v3			RNAi			5 µg	62-261
MKK4							
Antibody							
Anti-MKK4 CT, Rb Mab		H M R	FC IP WB IH(P)	Pur	Rb IgG	100 µL	04-382
Anti-phospho-MKK4 (Ser257/Thr261)		H	WB		Rb IgG	100 µL	07-857
Protein							
MKK4/SKK1, active			KA	Pur		10 µg	14-377
MKK4/SKK1, unactive			KA			50 µg	14-378
siRNA							
siRNA plasmid, pKD-MKK4/SKK1-v2			RNAi			5 µg	62-263
siRNA plasmid, pKD-MKK4/SKK1-v4			RNAi			5 µg	62-264
siRNA plasmid, pKD-MKK4/SKK1-v4			RNAi			5 µg	62-264
siRNA plasmid, pKD-MKK4/SKK1-v2			RNAi			5 µg	62-263
MKK6							
Antibody							
Anti-MKK6/SKK3		H M R	WB	Pur	Rb IgG	200 µg	07-417
Anti-MKK6 NT, Rb Mab		H M R	IP WB	Pur	Rb IgG	100 µL	04-383
Protein							
MKK6/SKK3, active			KA			10 µg	14-303
MKK6/SKK3, unactive			KA			50 µg	14-304
MKK6/SKK3 (S599D, T603D), active			KA			10 µg	14-537
siRNA							
MKK6 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003967
MKK6 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-094
siRNA plasmid, pKD-MKK6/SKK3-v1			RNAi			5 µg	62-200
siRNA plasmid, pKD-MKK6/SKK3-v2			RNAi			5 µg	62-201
siRNA plasmid, pKD-MKK6/SKK3-v2			RNAi			5 µg	62-201
MKK7							
Antibody							
Anti-MKK7/SKK4		H	WB		Rb IgG	100 µg	07-399
Anti-phospho-MKK7/SKK4 (Thr275/Ser277)		H	WB		Rb IgG	100 µL	36-010
Anti-phospho-MKK7/SKK4 (Thr275)		H	WB	Pur	Rb IgG	200 µg	36-013
Protein							
MKK7α1, active			KA	APur		25 µg	14-301
MKK7β1, active			KA			10 µg	14-543
MKK7β1, unactive			KA			50 µg	14-542
siRNA							
MKK7 siRNA/siA Assay Kit		H	WB RNAi			1 kit	60-095
siRNA plasmid, pKD-MKK7-v2		H M	RNAi			5 µg	62-154
siRNA plasmid, pKD-MKK7-v5		H M	RNAi			5 µg	62-155
MKK7 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-004016

MLCK (Myosin Light Chain Kinase)

Antibody							
Anti-phospho-Myosin Light Chain Kinase (MLCK) (Ser1760)		B Rb	WB	APur	Rb IgG	100 µL	07-860
MLCK, active			KA			10 µg	14-638

MKP-1

MKP-1 belongs to a protein-tyrosine phosphatase family that dephosphorylats MAP Kinase 2 / ERK2 on both Thr183 and Tyr185 sites. MKP-1 is induced by oxidative stress and heat shock-inducible gene and is thought to play a regulatory role in the MAPK and stress-activated protein kinase signaling pathways.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-MKP1		H M	WB	Pur	Rb IgG	100 µg	07-535

MSK-1

MSK1 (mitogen-and-stress-activated protein kinase 1) contains two protein kinase domains in a single polypeptide. It is activated *in vitro* by MAPK2/Erk2 or SAPK2/p38. Endogenous MSK1 is activated in 293 cells by either growth factor/phorbol ester stimulation, or by exposure to UV radiation and oxidative and chemical stress. MSK1 may mediate the growth factor and stress-induced activation of CREB.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-phospho-MSK1 (Ser376)		H	WB		Rb IgG	100 µL	04-384

p38 (α, β, δ, γ)

The p38 family refers to the SAPK2/3 Kinases, a subfamily of JNK/SAPK family. p38/SAPK Kinases are also activated by stresses, most notably inflammatory cytokines, irradiation, and certain toxins such as anisomycin, and arsenite. The activating kinases of SAPK2/3 are SKK2/MEK3 for SAPK2a and 2b, and MKK6 for SAPK3. The targets of the SAPK2/3 family include the MAPKAP Kinases 2 and 3/3pK. In addition, SKK4 is related to this family, exhibiting 60% identity, and is activated by MKK6. SAPKs have been implicated in many pathological conditions, including inflammation, cancer, and neurodegenerative diseases.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-p38/SAPK2	2F11	H M R	IP WB	Pur	M IgG	200 µg	05-454
Polyclonal Antibody							
Anti-phospho-p38α (Thr180/Tyr182)		H M R	WB IF IP IPK	APur	Rb IgG	100 µL	09-470
Anti-p38a		H M R B	WB IP IPK KA	APur	Rb IgG	100 µg	09-272
Anti-p38δ/SAPK4		H R	WB	Pur	Rb IgG	200 µg	07-603
Anti-p38δ/SAPK4		H R Rb	IP WB	APur	Sh IgG	100 µg	06-652
Anti-p38γ/SAPK3		M R	WB	Pur	Rb IgG	200 µg	07-139
Anti-p38γ/SAPK3		H	WB	Pur	Rb IgG	200 µg	07-474
Anti-p38γ/SAPK3			WB	antiserum	Rb IgG	200 µL	07-508
Protein							
p38α/SAPK2a, active			KA	Pur		10 µg	14-210
p38α/SAPK2a, active			KA			10 µg	14-251
p38α/SAPK2a, unactive			KA			50 µg	14-252
p38α/SAPK2a (6His-tag), active			KA			10 µg	14-587
p38α/SAPK2a (6His-tag), unactive			KA			50 µg	14-588
p38α/SAPK2a (T106M), active			KA	Pur		10 µg	14-687
p38β2/SAPK2b2, active			KA			10 µg	14-253
p38γ/SAPK3, active			KA			10 µg	14-246
p38δ/SAPK4, active			KA			10 µg	14-249
siRNA							
siRNA plasmid, pKD-p38α/SAPK2a-v1		H	RNAi			5 µg	62-294
siRNA plasmid, pKD-p38α/SAPK2a-v3		H M R	RNAi			5 µg	62-295
siRNA plasmid, pKD-p38β2/SAPK2b2-v1			RNAi			5 µg	62-208
siRNA plasmid, pKD-p38β2/SAPK2b2-v4			RNAi			5 µg	62-209
siRNA plasmid, pKD-Sapk2b-v1		H	RNAi			5 µg	62-328
siRNA plasmid, pKD-Sapk2b-v2		H	RNAi			5 µg	62-329
p38γ *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003590
siRNA plasmid, pKD-p38γ/SAPK3-v3		H	RNAi			5 µg	62-118
siRNA plasmid, pKD-p38δ/SAPK4-v3			RNAi			5 µg	62-220
siRNA plasmid, pKD-p38δ/SAPK4-v4			RNAi			5 µg	62-221
p38/SAPK2 *SMART*pool siRNA reagent			RNAi			5 nmol	M-003512
p38/SAPK2 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-032
Assay							
Non-radioactive p38 Kinase Assay Kit		H M R	Activity			40 assays	SGT455
p38α/SAPK2a Assay Kit, 50 Assays			KA			1 kit	17-169
p38α/SAPK2a KinEASE FP Fluorescein Green Assay			KA			1 kit	32-046
p38α/SAPK2a KinEASE FP-645nm FarRed Assay			KA			1 kit	32-126
p38β2/SAPK2b2 KinEASE FP Fluorescein Green Assay			KA			1 kit	32-047
p38β2/SAPK2b2 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-127
p38δ/SAPK4 KinEASE FP Fluorescein Green Assay			KA			1 kit	32-049

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Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
p38δ/SAPK4 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-129
p38γ/SAPK3 KinEASE FP Fluorescein Green Assay			KA			1 kit	32-048
p38γ/SAPK3 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-128
Inhibitors							
p38/SAPK2 Inhibitor (SB 202190)			KA			1 mg	19-134
p38/SAPK2 Inhibitor (SB 203580)			KA			1 mg	19-135

PAK

p21-activated kinases (PAK) are Ser/Thr kinases, which are activated by, and are effectors of Rho family of GTPases. As such, they are implicated in Actin polymerization, and activation of the stress-activated kinase cascades. PAK1 is phosphorylated by cdk5, resulting in its inhibition. PAK2 can be activated by Caspase-cleavage in addition to p21-binding, implicating it in cytoskeletal changes during apoptosis. PAK3 is expressed at high levels in post-mitotic neurons of the developing post-natal cerebral cortex and hippocampus, and is the mutant gene thought responsible for non-syndromic X-linked mental retardation.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-PAK1, Rb Mab		H M R	IF IP WB IH(P)			100 µL	04-394
Anti-PAK3, Rb Mab		H M R	IF IP WB IH(P)		Rb IgG	100 µL	04-395
Anti-PAK3, NT		M R	IP WB	Pur	Rb IgG	200 µg	06-902
Anti-PAK1 (Ser144)/PAK2 (Ser141), phospho-specific		H	WB	APur	Rb	100 µL	AB3833
Anti-PAK1 (Ser199/204)/PAK2 (Ser192/197), phospho-specific		H	WB	APur	Rb	100 µL	AB3834
Anti-PAK2, phospho-specific (Ser20)		H	WB IH(P)	APur	Rb	100 µL	AB3836
Anti-PAK1		H M Mk R	IP WB IH(P)	APur	Rb	100 µL	AB3844
Anti-PAK1/2/3		H M Mk R	WB	APur	Rb	100 µL	AB3845
PAK-PBD GST Protein, Rac/Cdc42 binding domain				Pur			SGT224
Protein							
PAK2, active			KA			10 µg	14-481
PAK3, active			KA			10 µg	14-683
PAK4, active			KA			10 µg	14-584
PAK5, active			KA			10 µg	14-699
PAK6, active			KA			10 µg	14-633
Assay							
PAK2 KinEASE FP Fluorescein Green Assay			KA			1 kit	32-018
PAK2 KinEASE FP-645nm FarRed Assay			KA			1 kit	32-098

Paxillin

Paxillin is a 68 kDa focal adhesion protein that is phosphorylated on tyrosine residues in response to Integrin stimulation, growth factor stimulation, and oncogenic transformation (v-Src, v-Crk and BCR/ABL). Paxillin binds other focal adhesion proteins such as Vinculin, Talin, Tensin and FAK.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-Paxillin	5H11	H M R B Av	WB IP IC	Pur	M IgG_1	250 µg	05-417
Paxillin	349	H M R	WB ELISA	Pur	M IgG_1	100 µg	MAB3060
Anti-phospho-Paxillin (Tyr118)	30	H M	WB	Pur	M IgG_1	100 µg	MAB1145
Paxillin, phospho-specific [Tyr31]	M102	H	WB ELISA		M IgG_1	100 µL	MAB1146
Polyclonal Antibody							
Paxillin		H M R Rb Ca Ch	WB IP IC IH	Pur	Rb	50 µL	AB3794
Paxillin (Tyr118)		M	WB	APur	Rb IgG	100 µL	07-733
Paxillin [pS126]				APur			AB3793
Paxillin, phospho-specific [Ser178]		H	WB ELISA		Rb IgG	100 µL	AB1962
Phospho-Paxillin		H M R	WB IH(P)	APur	Rb	100 µL	AB3837

PI3 Kinase

PI3 Kinase (Phosphatidylinositol 3-Kinase) is responsible for phosphorylation of the 3 position of the inositol ring of PI(4,5)P2, to generate PI(3,4,5)P3, a potent second messenger required for survival signaling, and insulin action. PI3 Kinase is a heterodimeric complex composed of an 85 kDa regulatory subunit and a 110 kDa catalytic subunit. Tyrosine phosphorylation of growth factor receptors creates docking sites for binding of p85 (through its SH2 domains) on the receptors; p85 brings with it p110, which is then proximal to its phospho-lipid substrate on the membrane. PI3 Kinase is also activated by Ras, and by the β:γ subunits of heterotrimeric G-proteins. PI3 Kinase is inhibitable by wortmannin, a useful tool for the study of the PI3 Kinase signaling pathway.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-PI3 Kinase, p85, N-SH3	AB6	H M	IP WB IC	Pur	M $IgG_{1\kappa}$	100 µg	05-212
Anti-PI3 Kinase, p85, N-SH2	UB93-3	H M R	IP WB	Sup	M IgG	200 µL	05-217
Anti-PI3 Kinase, p110δ	AW103	H	WB	Pur	M $IgG_{1\kappa}$	200 µg	05-703

Phosphorylation and Phosphotyrosine, clone 4G10®

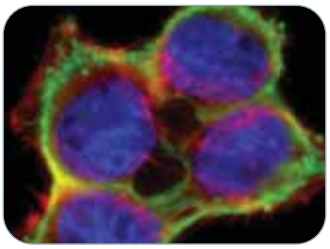
Phosphorylation

Many aspects of cell activity are controlled by reversible phosphorylation of target proteins that are mediated by protein kinases and their subsequent dephosphorylation by phosphatases. In many cases, mutations or misregulation of members of these two families of enzymes, kinase and phosphatases, are indicated in various disease states. Protein kinases play crucial roles in the regulation of many cellular events such as signal transduction, cell cycle progression, targeted proteolysis, protein trafficking, cytoskeletal organization, and gene expression. A protein's activity may be enabled or inhibited by the phosphorylation of specific serine, threonine, or tyrosine amino acids by protein kinases resulting in altered conformations.

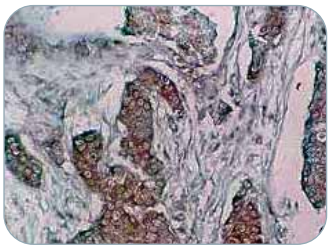
Anti-Phosphotyrosine, clone 4G10

The Gold Standard in Anti-Phosphotyrosine Antibodies

The development of the anti-Phosphotyrosine clone 4G10 in 1989 was a monumental discovery for researchers as it facilitated the study of tyrosine kinase activity by removing the need for radioactivity and converting the method to a simple blotting procedure. Millipore's clone 4G10 was the first and is still the most highly cited and validated phosphotyrosine antibody to consistently produce high quality, reproducible data. Over the past 17 years, clone 4G10 has been validated by thousands of scientific and medical researchers in virtually every application and tyrosine target including western blot (WB), flow cytometry (FC), fluorescence polarization (FP), ELISA, Homogeneous Time Resolved Fluorescence (HTRF®), immunocytochemistry (ICC), immunohistochemistry (IHC) and immunoprecipitation (IP). Clone 4G10 is now a critical tool for researchers in areas as diverse as serine/threonine phospho-proteins (including p38, Akt, and ERK 1/2), G-proteins, and neurological targets. For your full range of research needs, clone 4G10 is available as a number of conjugates including agarose, biotin, FITC, and HRP as well as the newly released Catch and Release® Phosphotyrosine, clone 4G10 for easier, cleaner immunoprecipitation of your tyrosine phosphorylated material. In addition to its unparalleled characterization and applicability, Clone 4G10 is well known as one of the most sensitive phosphotyrosine antibodies, detecting at least twice as many phosphoproteins in a side-by-side comparison with PY20 and PT-66 by independent investigators. This sensitivity is also observed in other applications, including FP, where clone 4G10 and recombinant clone 4G10 from Millipore were shown to be more sensitive that other anti-phosphotyrosine antibodies tested.



EGF treated A431 cells that are triple stained with anti-Phosphotyrosine, clone 4G10 (green), anti-actin Alexa Fluor® 555, (red), and Dapi nuclei, (blue).



Clone 4G10 IHC Stain: Paraffin embedded poorly-differentiated adenocarcinoma, stained with anti-phosphotyrosine, clone 4G10 (Cat. No. 05-321) at 10 µg/mL.

Antibodies

Description	Quantity	Cat. No.
Phosphotyrosine, clone 4G10	100 µg	05-321
Phosphotyrosine, clone 4G10	1 mg	05-321MG
Phosphotyrosine, clone 4G10	50 µg	05-321X
Phosphotyrosine, recombinant clone 4G10	1 mg	05-777

Conjugates

Description	Quantity	Cat. No.
Phosphotyrosine, clone 4G10, agarose conjugate	1 mg	16-101
Phosphotyrosine, clone 4G10, HRP conjugate	10 blots	16-105
Phosphotyrosine, clone 4G10, FITC conjugate	100 µg	16-104
Phosphotyrosine, clone 4G10, biotin conjugate	100 µg	16-103
Phosphotyrosine, recombinant clone 4G10, HRP conjugate	10 blots	16-184
Phosphotyrosine, recombinant clone 4G10, agarose conjugate	1 mg	16-199
Phosphotyrosine, recombinant clone 4G10, FITC conjugate	100 µg	16-205
Catch and Release Phosphotyrosine, clone 4G10	50 assays	17-502

For a complete listing of products, please visit our website at **www.millipore.com**.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-PI3 Kinase, p110α, Rb Mab		H	IF IP WB		Rb IgG	100 µL	04-399
Anti-PI3 Kinase, p110β, Rb Mab		H	FC IP WB		Rb IgG	100 µL	04-400
Anti-PI3 Kinase, p110δ;, Rb Mab		H	IF IP WB		Rb IgG	100 µL	04-401
Anti-PI3 Kinase, p110γ, Rb Mab		H	FC IP WB		Rb IgG	100 µL	04-402
Anti-PI3 Kinase, p85α, Rb Mab		H M R	FC IP WB IC IH(P)		Rb IgG	100 µL	04-403
Anti-PI 3-Kinase p85α	8-2D-4D	H M R	FC IF IP	Pur	M IgG_1	100 µg	MAB1143
Polyclonal Antibody							
Anti-PI3 Kinase, p85		H M Mk R	IP WB	antiserum	Rb IgG	125 µL	06-195
Anti-PI3 Kinase, p85, N-SH2 domain		H M Mk R	IP WB	Pur	Rb IgG	250 µg	06-496
Anti-PI3 Kinase, p85		H M Mk R	IP WB	Pur	Rb IgG	250 µg	06-497
Anti-PI3 Kinase, p110b		B H M R	IP	Pur	Rb IgG	200 µg	06-568
Anti-PI3 Kinase, p101		H R	WB	Pur	Rb IgG_1	200 µg	07-281
Anti-PI3 Kinase, p110a		H WR	IP	Pur	Rb IgG	200 µg	07-658
Anti-PI4-Kinase b		H M R	IP WB IC	Pur	Rb IgG	200 µg	06-578
siRNA							
PI3 Kinase p85a siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-048
siRNA plasmid, pKD-PI3 Kinase, p85-v3			RNAi			5 µg	62-222
PI3 Kinase p85a *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003020
Protein							
PI3 Kinase (p110β/p85a), active			KA			20 µg	14-603
PI3 Kinase (p110δ/p85a), active			KA			10 µg	14-604
PI3 Kinase (p110α/p85a), active			KA			20 µg	14-602
PI3 Kinase (p120γ)			KA			20 µg	14-558
Wortmannin, (PI3 Kinase inhibitor)			KA			1 mg	12-338
Assay							
PI 3-Kinase HTRF Assay			KA			1 plate	33-016
PI 3-Kinase HTRF Assay			KA			5 plates	33-017

PKA

Protein kinase A is perhaps the prototype Ser/Thr kinase, which is activated by the second messenger cyclic AMP (cAMP). The PKA holoenzyme consists of two catalytic subunits complexed with two regulatory subunits. In addition, the regulatory subunits bind various AKAP proteins, which localize the holoenzyme to specific locations within the cell. Binding of cAMP to the regulatory subunits results in release of catalytic subunits, which phosphorylate an extremely broad range of substrates, including the transcription factor CREB. PKA activity in a lysate can be neutralized with the pseudosubstrate PKI.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-PKA, RII Subunits		H R	IP WB IC	Pur	Gt IgG	500 µg	06-411
Anti-phospho-PKA, RII (Ser96)		M R	WB	Pur	Rb IgG	100 µg	06-704
Anti-PKA, NT		B H Ht M Po R	WB	Pur	Rb IgG	200 µg	06-903
Anti-phospho-PKA catalytic subunits a/b (Thr197)		M	WB	APur	Rb IgG	100 µL	07-867
Anti-phospho-PKA Catalytic b subunit (Ser338)		M	WB	APur	Rb IgG	100 µL	07-868
Anti-phospho-PKA, Regulatory subunit IIb (Ser114)		M	WB	APur	Rb IgG	100 µL	07-869
Assay							
PKA Assay Kit			KA			1 kit	17-134
PKA KinEASE FP Fluorescein Green Assay			KA			1 kit	32-020
PKA KinEASE FP-645nm FarRed Assay			KA			1 kit	32-100
Reagents							
PKA Inhibitor Cocktail			KA			1 mL	20-114
PKA Inhibitor Peptide			KA			1 mL	20-120
PKA/PKC Inhibitor Cocktail			KA			1 mL	20-129
PKA/CaMK Inhibitor Cocktail			KA			1 mL	20-132
siRNA							
PKA siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-115
siRNA plasmid, pKD-PKAa-v2		H	RNAi			5 µg	62-069
siRNA plasmid, pKD-PKAa-v3		H	RNAi			5 µg	62-070
Anti-cAMP-Dependent Protein Kinase,		H M Mk	WB IH	APur	Rb	100 µg	AB1612

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Regulatory Subunit I-β, internal							
Anti-cAMP-Dependent Protein Kinase, Regulatory Subunit II-α		H M Mk	ELISA FC IP WB IH	APur	Rb	100 µg	AB1613
Anti-cAMP-Dependent Protein Kinase, Regulatory Subunit II-β, internal		H M Mk Ech	WB IH	APur	Rb	100 µg	AB1614
PKA *SMART*pool siRNA reagent			RNAi			5 nmol	M-004649
Anti-cAMP-Dependent Protein Kinase II, Regulatory Subunit α/β	RS30	B H Po	ELISA IF WB	Pur	M IgG_{2a}	100 µg	MAB1697
Protein							
PKA, catalytic subunit			KA			10 µg	14-114
PKA, catalytic subunit, recombinant			KA			10 µg	14-440
PKA Substrate Peptide			KA			2 mg	12-152
PKA Substrate Peptide, biotin conj.			KA			500 µg	12-394
PKA Inhibitor peptide			KA			2 mg	12-151

PKC

Members of the PKC family fall into three categories: conventional (PKC α, βI, βII, γ), Novel (δ, ε, η, µ), and atypical (λ, ζ). Conventional PKC isoforms are dependent on Ca^{2+} and diacylglycerol (DAG) for their activity, whereas novel PKC isoforms are Ca^{2+}-independent, and atypical PKC isoforms are Ca^{2+}- and DAG-independent. All PKC isoforms are dependent on membrane phospholipid, although some may become activated in a soluble form. PKC family members are broad-specificity kinases, which phosphorylate many proteins, the best known of which are MARCKS and nuclear lamins. The role of phorbol ester activators of PKC as tumor promoters clearly implicates PKC as activators of signaling pathways, including the MAP kinase pathway.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
PKC, active			KA			1 µg	14-115
Assays							
PKC Assay Kit			KA			1 kit	17-139
PKC/CaMK Inhibitor Cocktail			KA			1 mL	20-119
PKC Substrate Cocktail			KA			1 mL	20-131
PKC Lipid Activator			KA			1 mL	20-133

PKCα

Antibody							
Anti-PKCα	M4	B H M R Rb	IP WB NEUT	Pur	M IgG_1	100 µg	05-154
Anti-Protein Kinase Cα	1F3.2	H	ELISA WB	Asc	M IgM	100 µL	MAB3074
Anti-phospho-PKCα (Ser657)		B H M R Rb	WB	Pur	Rb IgG	200 µg	06-822
Anti-PKCα, β, γ		B H M R Rb	WB	Pur	Rb IgG	200 µg	06-870
Anti-phospho-PKCα (Thr638)		H M	WB	APur	Rb IgG	100 µL	07-871
PKCα siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-110
siRNA plasmid, pKD-PKCα-v4		H	RNAi			5 µg	62-104
siRNA plasmid, pKD-PKCα-v6		H M	RNAi			5 µg	62-105
PKCα *SMART*pool siRNA reagent			RNAi			5 nmol	M-003523
PKCα, active			KA			10 µg	14-484

PKCβ

Antibody							
Anti-PKCα, β, γ		B H M R Rb	WB	Pur	Rb IgG	200 µg	06-870
Anti-PKC ζ		H M R	WB	antiserum	Rb IgG	200 µL	07-264
Anti-phospho-PKCβ I (Thr642)		H	WB	APur	Rb IgG	100 µL	07-872
Anti-phospho-PKCβ II (Thr641)		H	WB	APur	Rb IgG	100 µL	07-873
Anti-phospho-PKCβ I&II (Thr500)		H	WB	APur	Rb IgG	100 µL	07-870
PKCβI, active			KA			10 µg	14-503
PKCβII, active			KA			10 µg	14-496

PKCδ

Antibody							
Anti-PKCδ		H M R	WB	Pur	Rb IgG	200 µg	06-990
Anti-phospho-PKCδ (Ser645)		H	WB	APur	Rb IgG	100 µL	07-874
Anti-phospho-PKCδ (Ser664)		H	WB	APur	Rb IgG	100 µL	07-875
Anti-PKC δ		H M	IP WB IH	Pur	Sh	100 µg	AB1685
siRNA plasmid, pKD-PKCδ-v3		H	RNAi			5 µg	62-071

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
siRNA plasmid, pKD-PKCδ-v6		H M R	RNAi			5 µg	62-072
PKCδ, active			KA			10 µg	14-504

PKCγ

Antibody

Anti-PKCα, β, γ		B H M R Rb	WB	Pur	Rb IgG	200 µg	06-870
Anti-phospho-PKCγ (Thr514)		H	WB	APur	Rb IgG	100 µL	07-878
Anti-phospho-PKCγ (Thr655)		H	WB	APur	Rb IgG	100 µL	07-879
Anti-phospho-PKCγ (Thr674)		H	WB	APur	Rb IgG	100 µL	07-880
PKCγ, active			KA			10 µg	14-483

PKCε

Antibody

Anti-phospho-PKCε (Ser729)		H M R Rb	WB	Pur	Rb IgG	200 µg	06-821
Anti-PKCε		H M R	IP WB IH	Pur	Rb IgG	200 µg	06-991
PKCε siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-111
siRNA plasmid, pKD-PKCε-v1		H	RNAi			5 µg	62-121
siRNA plasmid, pKD-PKCε-v5		H	RNAi			5 µg	62-122
PKCε *SMART*pool siRNA reagent			RNAi			5 nmol	M-004653
PKCε, active			KA			10 µg	14-518

PKCη

Antibody

PKC η, active			KA			10 µg	14-497

PKCι

Antibody

Anti-phospho-PKCι (Thr555)/PKCλ (Thr563)		H M	WB	APur	Rb IgG	100 µL	07-881
PKC ι, active			KA			10 µg	14-505

PKCμ

Antibody

Anti-phospho-PKCμ/PKD (Ser742)		H M	WB	APur	Rb IgG	100 µL	07-882
PKCμ, active			KA			10 µg	14-508

PKCτ

Antibody

Anti-phospho-PKCτ (Ser676)		H	WB	APur	Rb IgG	100 µL	07-883
Anti-phospho-PKCτ (Ser695)		H	WB	APur	Rb IgG	100 µL	07-884
Anti-phospho-PKCτ (Thr538)		H	WB	APur	Rb IgG	100 µL	07-885
PKC τ, active			KA			10 µg	14-444

PKCζ

Antibody

PKCζ siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-112
siRNA plasmid, pKD-PKCζ-v1		H	RNAi			5 µg	62-073
siRNA plasmid, pKD-PKCζ-v3		H	RNAi			5 µg	62-074
PKCζ *SMART*pool siRNA reagent			RNAi			5 nmol	M-003526
PKC ζ, active			KA			10 µg	14-525

PP1

Type 1 protein Ser/Thr phosphatases (PP1) have a high specific activity against phosphorylase, and are resistant to okadaic acid up to concentrations of 50 nM, but sensitive to Inhibitor-2 and microcystin LR.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-PP1α		B H M R Rb	WB	Pur	Rb IgG	200 µg	06-221
Anti-PP1δ		B H M R	IP WB	APur	Rb IgG	200 µL	07-270
Anti-PP1α		H M	WB	APur	Rb IgG	200 µL	07-273
Anti-Protein Phosphatase 1 α		B H M R	IP WB	APur	Rb IgG	100 µg	AB4082
Anti-Protein Phosphatase 1 β		B H M R	IP WB	Pur	Rb	100 µg	AB4083
Anti-Protein Phosphatase 1 γ1		B H M R	IP WB	Pur	Rb	100 µg	AB4084
Anti-Protein Phosphatase 1 γ2		B H M R	IP WB	Pur	Sh	100 µg	AB4085

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Assay							
PP1/PP2A Toolbox			PA			1 kit	17-301
Protein							
PP1α			KA	Pur		10 µg	14-595
PP1, Pured			PA			10 units	14-110
Inhibitor 2			PA			100 µg	14-162

Prenylation

see FNTA, FNTB, ICMT, and Rce-1

PTEN

The PTEN (MMAC1) tumor suppressor is a lipid phosphatase that removes the 3' phosphate from PI(3,4,5)P3. Overexpression of PTEN inhibits cell migration, and expression of antisense PTEN mRNA enhances migration. Integrin-mediated cell spreading is down-regulated by wild-type PTEN.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-PTEN	6H2.1	H M R	WB IP IHC IC		M IgG	100 µg	04-035
Anti-PTEN, Rb Mab		H M R	WB IH(P) IF FC IP		Rb IgG	100 µL	04-409
Polyclonal Antibody							
Anti-phospho-PTEN (Ser370)		M	WB	APur	Rb IgG	100 µL	07-889
Anti-phospho-PTEN (Ser385)		H	WB	APur	Rb IgG	100 µL	07-890
Anti-phospho-PTEN (Ser380/Thr382/ Thr383/Ser385)		H M	WB	APur	Rb IgG	100 µL	07-891
Assay							
PTEN Malachite Green Assay Kit			PA			1 kit	17-351
PTEN Enzyme Assay Buffer, 5X			PA			1 mL	20-165
siRNA							
PTEN *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003023
Anti-PTEN, C-terminus	A2b1	H M R	IP WB IC IH not IH(P)	Pur	M IgG_1	100 µg	MAB4037
Protein							
PTEN, active			PA			10 µg	14-488

PTP

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Polyclonal Antibody							
Anti-PTP-PEST	AG25	H M	WB IP IC	Asc	M IgG_1	100 µL	MAB3739
PTPMEG-2			KA	Pur		10 µg	14-592
LMPTP-B			PA			10 µg	14-620
LMPTP-A			PA			10 µg	14-619
PTPMEG-1			PA			10 µg	14-642
HePTP			KA	Pur		10 µg	14-593
TCPTP			PA			10 µg	14-646

PTP-1D

see SHP-2 below

Rac

Rac is a member of the Rho family of small GTP-binding proteins, and plays roles in cytoskeletal actin organization as well as transformation. Rac is activated downstream of cdc42, or independently by Ras signaling, and in turn Rac stimulates Rho. Activation of Rac results in the formation of lamellipodia, whereas cdc42 stimulates filopodia formation, and Rho stimulates formation of actin stress fibers. Effectors of the Rac pathway include NADPH Oxidase and the SAPK1/JNK family of kinases. The latter pathway is activated by the PAK kinases, which are direct targets of Rac.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-Rac1	23A8	H M R	IP WB IH	Pur	M IgG_{2b}	250 µg	05-389
Polyclonal Antibody							
Anti-Rac2		H M	IP WB APA	Serum	Rb IgG	50 µL	07-604
Anti-phospho-Rac1/cdc42 (Ser71)		H	WB	APur	Rb IgG	100 µL	07-896
Anti-Rac1/Cdc42, phospho-specific (Ser71)		H	WB	APur	Rb	100 µL	AB3838
Anti-Rac1		H M R	WB	Pur	Rb	100 µg	AB4202
Recombinnat Protein							
Rac/cdc42 Assay Reagent (PAK1 PBD, agarose)			ABA			300 µg	14-325

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Assay								
	Rac1 Activation Assay Kit			ABA			1 kit	17-283
	Rac2 Activation Assay Kit			ABA			30 assays	17-369
	Rac1 Activation Assay (96 well)			ABA			96 assays	17-450
	Rac1/Cdc42 Activation Assay (96 well)			ABA			96 assays	17-452
cDNA								
	Rac1 cDNA (activated) in pUSEamp			TFX			5 µg	21-193
	Rac1 cDNA (dominant negative) in pUSEamp			TFX			5 µg	21-199
	Rac1 cDNA Allelic Pack			TFX			1 kit	17-309
	Rac1 cDNA (wt) in pUSEamp			TFX			5 µg	21-200
siRNA								
	Rac1 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-037
	Rac1 *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-003560
	Anti-Rac1	102	H M R Ca Ch Dr	IF WB IH	Pur	M IgG_{2b}	100 µg	MAB3735

Raf

The Raf proteins (Raf-1, A-Raf, B-Raf) are Ser/Thr kinases with homology to the PKC family, containing an n-terminal regulatory domain and a c-terminal catalytic domain. Members of the Raf family bind to activated Ras GTPase, which results in Raf translocation to the plasma membrane and activation. Activated Raf proteins phosphorylate MEKs, and are therefore the principle transducers of signals from Ras to MAP kinase. In addition to its role in mitogenesis, Raf-1 may play a role in regulation of apoptosis and cell cycle progression. Activation of Raf-1 involves phosphorylation of Ser338/339 and Tyr340/341. Activating mutations of B-Raf that disrupt its auto-inhibition loop have been implicated in a number of cancers, including melanoma and colon cancer.

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody								
	Anti-Raf-1	AM223		IP WB	Pur	Rb IgG	100 µg	05-739
	Anti-Raf-1, Rb Mab			WB IP IF IH(P)		Rb IgG	100 µL	04-412
	Anti-phospho-Raf-1 (Ser259), Rb Mab			WB IF IH(P)		Rb IgG	100 µL	04-411
	Anti-phospho-Raf-1 (Ser338)		M	WB	Pur	R IgG_1	100 µg	05-534
	Anti-phospho-Raf-1 (Ser338)		M	WB	Pur	M IgG	200 µg	05-538
	Anti-phospho-Raf-1 (Ser338)			WB	Pur	M IgG	1 mg	05-538MG
	Anti-C-raf (phospho-Ser 621)		H M	WB	Pur			04-306
Polyclonal Antibody								
	Anti-Raf-1		H	IPK WB	Pur	Rb IgG	200 µg	07-396
	Anti-B-Raf		H M R	IPK WB	Pur	Rb IgG	200 µg	07-453
	Anti-B-Raf, NT		H M R	KA WB	APur	Rb IgG	200 µL	07-583
	Anti-phospho-Raf1 (Ser259)		H	WB	APur	Rb IgG	100 µL	07-811
	Anti-phospho-Raf1 (Ser43)		H	WB	APur	Rb IgG	100 µL	07-812
	Anti-phospho-Raf-1 (Ser621)		H	WB	APur	Rb IgG	100 µL	07-813
	Anti-phospho-Raf-1 (Ser338/Tyr340)		H	WB	APur	Rb IgG	100 µL	07-814
	Anti-phospho-Raf-1 (Tyr340/Tyr341)		H	WB	APur	Rb IgG	100 µL	07-815
Assay								
	Raf-1 Kinase Cascade Assay Kit			IPK KA			1 kit	17-357
	B-Raf Kinase Cascade Assay Kit			IPK KA			1 kit	17-358
	B-Raf Kinase Assay Kit, Chemiluminescence Detection			KA WB			1 kit	17-359
	Raf-1 Kinase Assay Kit, Chemiluminescence Detection			KA			1 kit	17-360
Protein								
	Raf-1-RBD GST Protein, ras binding domain				Pur		300 µg	SGT223
cDNA								
	Raf-1 cDNA (wt) in pUSEamp			TFX			5 µg	21-111
siRNA								
	Raf-1 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-109
	siRNA plasmid, pKD-Raf-1-v4		H M R	RNAi			5 µg	62-085
	siRNA plasmid, pKD-Raf-1-v6		H	RNAi			5 µg	62-086
	Raf-1 *SMART*pool siRNA reagent			RNAi			5 nmol	M-003601
Protein								
	B-Raf (V599E), active			KA			10 µg	14-557
	B-Raf (δ1-415), active			KA			10 µg	14-530
	Raf-1 (truncated), active			KA			10 µg	14-352

Ral

RalA and RalB are Ras-family small G-Proteins that can be activated through a Ras-dependent mechanism. Mutants of Ras that are defective in activating all known Ras effectors except Ral GEF are still able to induce invasive phenotypes in transfected cells, suggesting a role for Ral in these processes.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-RalB	25	H M R	WB	Pur	M IgG	100 µL	309
Protein							
Ral Assay Reagent (Ral BP1, agarose)			ABA			300 µg	14-415
Assays							
RalA Activation Assay Kit			ABA			1 kit	17-300
RalB Activation Assay Kit			ABA			1 kit	17-439
Ral Activation Assay Buffer, 5X			ABA			18 mL	20-196
cDNA							
RalA cDNA (activated) in pUSEamp			TFX			5 µg	21-189
RalA cDNA (dominant negative) in pUSEamp			TFX			5 µg	21-187
RalA cDNA (wt) in pUSEamp			TFX			5 µg	21-190

Ran

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Ran		H Xn	WB IP IC	antiserum	Rb IgG	200 µL	07-517
RanGEF (RCC1)			WB IP IC	antiserum	Rb IgG	200 µL	07-519

RanBP17

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
RanBP17		H	WB ELISA	APur	Rb	100 µg	AB3488

Rap

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Rap1 Activation Assay Kit			ABA			1 kit	17-321
Rap1 Assay Reagent (Ral GDS-RBD, agarose)			ABA			650 µg	14-455

Rap1GAP

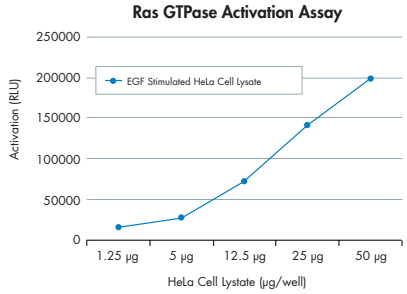
Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Rap1GAP (N-term)							04-413

Ras

Ras proteins are small GTP-binding proteins which contain all GTPase and effector functions within a single polypeptide. Three isoforms of Ras exist, Ki-Ras, Ha-Ras, and N-Ras, with distinct expression patterns but similar signaling activity. Ras is palmitoylated and farnesylated at the c-terminus, anchoring it in the membrane. In resting cells, Ras is loaded with GDP; activation by growth factor stimulation of receptors (for example) recruits Guanine nucleotide Exchange Factors (GEFs) which induce exchange of GDP with GTP. In its GTP-bound form, Ras binds and activates effector proteins, such as Raf, RalGDS, or PI3 Kinase. GTP hydrolysis returns Ras to its inactive state; hydrolysis is accelerated by GTPase Activating Proteins (GAPs), such as RasGAP or NF-1.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-Ras	RAS10	H M R	ELISA FC IP WB IC IH	Pur	M $IgG_{2a\kappa}$	100 µg	05-516
Anti-Ha-Ras	MC57	H	WB	Pur	Rb IgG	100 µL	05-775
Anti-RasGAP	B4F8	B H Ht M R	IP WB IC	Pur	M IgG	200 µg	05-178
Polyclonal Antibody							
Anti-RasGAP		Av H M R	IP WB	Pur	Rb IgG	200 µg	06-157
Protein							
Ras-GST, agarose conj.			ABA			100 µg	14-139
Ras Assay Reagent (Raf-1 RBD, agarose)			ABA			600 µg	14-278
Ras, recombinant human full length				Pur		100 µg	SGT213
cDNA							
H-Ras cDNA (wt) in pUSEamp			TFX			5 µg	21-102
H-Ras cDNA (activated) in pUSEamp			TFX			5 µg	21-103
H-Ras cDNA (dominant negative) in pUSEamp			TFX			5 µg	21-104

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Assay								
	Ras GTPase Activation ELISA Kit-96 well		H M R	ELISA GPA			96 assays	17-424



Ras Activation Titration
Increasing amounts of EGF stimulated HeLa whole cell extracts were titrated in a 2 fold serial dilutions down to 1.25 mg of total cellular protein using the Ras GTPase Activation ELISA Kit.

	Ras Activation Assay Kit			ABA			1 kit	17-218
	H-Ras cDNA Allelic Pack			TFX			1 kit	17-267
siRNA								
	Ras siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-093
	siRNA plasmid, pKD-Ras-v1			RNAi			5 µg	62-214
	siRNA plasmid, pKD-Ras-v2			RNAi			5 µg	62-215
	Ras *SMART*pool siRNA reagent		H	RNAi			5 nmol	M-004142
	Anti-H-Ras	7D7.2	H M R	ELISA WB	Pur	M IgG_{2b}	100 µg	MAB3291

Prenylation

see, FNTA, FNTB, ICMT, and Rce-1

Rce1 (Ras converting enzyme 1)

Rce1 is a metalloproteinase that cleaves prenylated members of the Ras/Rho family of small G-proteins and nuclear Lamin. Cleavage of prenylated proteins is part of the required post-translational modification (prenylation by FT, cleavage by Rce1, methylation by Icmt) required for these proteins to become active.

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody								
	Anti-Rce-1		H	WB	APur	Rb IgG	100 mL	09-120

Rheb

Rheb is a member of the Ras family of GTPases, primarily expressed in the brain. It is a target of the TSC2 (Tuberous Sclerosis Complex 2) GAP (GTPase Activating Protein), and is thus integral in mTOR signaling. Two Rheb proteins have been identified, Rheb2 (aka Rheb, hRheb1 or Rheb2) and RhebL1 (aka hRheb2).

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody								
	Anti-RHEB1		H	WB	Pur	Rb IgG	100 µL	09-247

Rho

The Rho-family of small GTP-binding proteins includes Rac and cdc42, as well as several Rho isoforms. Collectively, this family is involved in the regulation of cytoskeletal changes that accompany signal transduction, and is also involved in the activation of the stress-activated MAP kinase cascades.

	Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody								
	Rho (-A, -B, -C)	3L74	H R	WB	Pur	Rb IgG	100 µL	05-822
	Rho (-A, -B, -C)	55	H M R	WB IC	Pur	M IgG_1	200 µg	05-778
	RhoE/Rnd3	4	H M	WB IC	ascites	M IgG	200 µL	05-723
	RhoG		H M	WB		M IgG	100 µg	04-486
	RhoGAP p190	D2D6	H M R Mk	WB IP	Pur	M IgG	200 µg	05-378
Polyclonal Antibody								
	Rho		H	WB	Pur	Rb	100 µg	AB3884
	RhoGDI		H M B	WB IP	Pur	Rb IgG	200 µg	06-730
Protein								
	Rho Assay Reagent (Rhotekin RBD, agarose)			ABA			650 µg	14-383
	Rhotekin, GST fusion protein						500 µg	14-662
	Rho-GST				Pur		20 µg	SGT212

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Assay							
Rho Activation Assay Kit			ABA			1 kit	17-294
cDNA							
RhoA cDNA (activated) in pUSEamp			TFX			5 µg	21-195
RhoA cDNA (dominant negative) in pUSEamp			TFX			5 µg	21-196
RhoA cDNA (wt) in pUSEamp			TFX			5 µg	21-194

RhoGAP

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-RhoGAP p190	D2D6	H M Mk R	IP WB	Pur	M IgG	200 µg	05-378
Anti-Rin	14G7	H	WB	Pur	M IgG_1	100 µg	MAB3744
Anti-Rit	27G2	H M	WB	Pur	M IgG_{2b}	100 µg	MAB3743

RKIP

RKIP, or Raf Kinase Inhibitory Protein is also known as PEBP (Phosphatidylethanolamine-Binding Protein). RKIP mediates the interaction between TAK1 and MEK3. RKIP is a cytoplasmic serine protease that inhibits Raf activity, and is also thought to inhibit Thrombin.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-RKIP		H M R	IP WB		Rb IgG	200 µg	07-137

ROK/ROCK

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
ROCK (1113) cleavage-specific product		H	WB	APur	Rb IgG	100 µL	07-903
ROCK-1		H M	WB	APur	Rb	100 µg	AB3885
ROKa/ROCK-II		R	WB IP	Pur	Rb IgG	200 µg	07-443
ROKa/ROCK-II	A9W4	H R	WB IP	Pur	Rb IgG	100 µL	05-841
siRNA plasmid, pKD-ROKa/ROCK-II-v4		H M R	RNAi			5 µg	62-075
siRNA plasmid, pKD-ROKa/ROCK-II-v6		H M R	RNAi			5 µg	62-076
ROKa/ROCK-II, active			KA			10 µg	14-451
ROKb/ROCK-I, active			KA			10 µg	14-601

SHC

SHC is expressed as three alternatively spliced adapter proteins which share an n-terminal PTB domain, a central glycine-rich sequence, and a c-terminal SH2 domain. SHC proteins are tyrosine phosphorylated by receptor tyrosine kinases and bind to phosphotyrosine residues on those receptors. SHC also binds GRB2, and in the case of many receptor tyrosine kinases, GRB2 requires SHC as an intermediate to bind the receptor.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
phospho-SHC (Tyr317)	15E11	H M	WB		M $IgG_{1\kappa}$	100 µg	05-668
Anti-shc (phospho-Tyr 239/pTyr 240)					M IgG	100 µg	04-312
Anti-shc/p66 (N-Terminus)					M IgG	100 µg	04-313
Anti-shc/p66 (phospho-Ser 36)					M IgG	100 µg	04-314
phospho-SHC (Tyr239)		H	WB ELISA	APur	Rb IgG	200 µL	07-209
phospho-SHC (Tyr317)		H M	WB	APur	Rb IgG	200 µL	07-206
SHC		H M R Po	WB IP IH	Pur	Rb IgG	250 µg	06-203
SHC		H M R	WB IP	antiserum	Rb IgG	200 µL	07-150
SHC [p66; SH2 domain Protein C1]				Pur		100 µL	AB3824

SOS

The mammalian homolog of Drosophila Son-of-Sevenless is a GDP/GTP exchange factor for Ras proteins, which has an SH3-binding motif that associates with GRB2. Together with GRB2, it associates with activated receptor tyrosine kinases in the plane of the membrane, and activates Ras. Expression of SOS 1 that is modified to constitutively reside at the membrane is transforming in most cells.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
SOS1, CT		H M	WB IP	Pur	Rb IgG	200 µg	07-337

STAT

STATs (Signal-Transducing Activators of Transcription) are the principle substrates of JAK kinases, and mediators of cytokine signaling. STAT proteins have SH2 domains, and once phosphorylated by JAK kinases, STATs dimerize in a head-to-tail fashion, through their SH2 domains. STAT1 is a critical mediator of IFN signaling and STAT3 is involved in multiple signaling pathways, and mice deficient in it are not viable. In addition to tyrosine phosphorylation, many STAT proteins are targets of Ser/Thr kinases, and those phosphorylation events potentiate STAT-induced transcription. The phosphorylation state of STATs can be monitored by phosphorylation state-specific antibodies. Please see our website or Transcription brochure for a complete listing of STAT products.

STAT1

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-STAT1, CT		H M	EMSA IP WB	Pur	Rb IgG	250 µg	06-501
Anti-STAT1	79	H M R	WB	Pur	M IgG_1	100 µg	05-987
Anti-STAT1a		H M	IP WB	Pur	Rb	100 µg	ab16951
Anti-phospho-STAT1 (Tyr701)		Ch H M R	WB	APur	Rb IgG	100 µL	07-307
Anti-STAT1, phospho-specific (Tyr701)		H	WB	APur	Rb	100 µL	ab3892
Anti-phospho-STAT1 (Ser727)		H M	WB	Serum	Rb	200 µL	07-714
STATPAK, Anti-STAT (1, 2, 3, 5A, 5B) Miniature Set			EMSA IP WB IC			1 kit	17-176
Assay							
STAT1a EZ-TFA		H M R	Activity			1 plate	70-535

STAT3

Antibody							
Anti-phospho-STAT3 (Tyr705)	9E12	H M	IP WB		M $IgG_{1\kappa}$	50 µg	05-485
Anti-phospho-STAT3 (Ser727)		M	WB	APur	Rb IgG	100 µL	07-703
Anti-STAT3		H M R	ChIP EMSA IP WB IC	Pur	Rb IgG	200 µg	06-596
Anti-STAT3, C-terminus		H M R	EMSA IP WB	Pur	Rb	100 µg	AB3162
Assay							
Anti-STAT3, phospho-specific (Ser727)	6E4	H M	IP WB IC IH(P)		M IgG_{2a}	100 µL	MAB3705
STAT3 Transcription Factor Assay		H M R				1 plate	SGT530

TAK

TAK1 (TGF-β activated kinase) is a member of the MAPKKK family and its kinase activity is stimulated in response to TGF-β, bone morphogenic protein (BMP) and ceramide. Activation of TAK1 is dependent on TAB1 (TAK1 binding protein 1), and overexpression of both together results in NIK-independent activation of NF-κB. TAK1 is an activator of SKK1/MEK4, but also phosphorylates SKK2/MEK3 and SKK3/MEK6 *in vitro*. Preliminary evidence suggests that mutations of TAK1 may play a role in lung cancer development.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Antibody							
Anti-C-TAK1 (cdc25C associated protein kinase)		H M	WB		M IgG	200 µg	05-680

VEGF and VEGF Receptor

VEGF is a dimeric ligand, and is among the most potent angiogenic mitogens. VEGF is secreted by tumor cells and other cells exposed to hypoxia. Expression of VEGF is stimulated by FGF-2, and it activates Flt-1 and KDR, the two high-affinity receptors for VEGF. The VEGF Receptors stimulate the Ras-MAPK pathway, suggesting that it signals as a conventional receptor tyrosine kinase.

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Monoclonal Antibody							
Anti-VEGF	JH121	H M R Rb	IP IH NEUT		M IgG_1	100 µg	05-443
Anti-VEGF, recognizes 121, 165, and 189 a.a. isoforms	VG1	H	ELISA WB IH(P)		M $IgG_{1\kappa}$	100 µg	MAB3734
Anti-VEGF	CH-10	H R	ELISA WB	Pur	M IgG_1	100 µg	MAB1665
Anti-VEGF Receptor-1		H M	ELISA WB	Pur	M IgG_1	50 µL	MAB1664
VEGFR-1 (N-term)							04-431

Description	Clone	Species	Applications	Format	Host	Quantity	Cat. No.
Anti-KDR/Flk-1/VEGFR2	CH-11	H M	ELISA WB IC IH		M IgG_1	100 µg	05-554
Anti-phospho-KDR/Flk-1/VEGFR2 (Tyr1054)	D1W	H M	WB	Pur	Rb IgG	100 µL	05-894
Anti-Flt-1	BK302	H	WB	Pur	M $IgG_{1\kappa}$	200 µg	05-696
Anti-VEGF Receptor-2	4H3B6H9	M	ELISA FC IP WB	Pur	R IgG_{2b}	100 µg	MAB1147
Anti-VEGF Receptor-2	89B3A5	M	FC IP WB	Pur	R IgG_{2a}	100 µg	MAB1669
Anti-VEGF Receptor-3, extracellular domain	9D9F9		FC IF IP WB IH(P)	Asc	M IgG_1	100 µL	MAB3757
Polyclonal Antibody							
Anti-VEGF, N-terminus		H	ELISA IP RIA WB	Pur	Rb	500 µg	CBL42
Anti-VEGF		H M	ELISA WB NEUT	Pur	Rb	100 µg	AB1442
Anti-VEGF		M	ELISA WB	Pur	Rb	100 µg	AB1876
Anti-VEGF		M	ELISA WB NEUT	APur	Rb	50 µg	AB2142P
Anti-phospho-VEGFR2/FLK-1/KDR (Ser1188)		H	WB	APur	Rb	100 µg	09-021
Anti-Flt-1, CT		H	WB		Ch IgY	200 µg	06-670
Anti-KDR/Flk-1/VEGFR2		H M	IP WB IH	antiserum	Rb IgG	200 µL	07-158
Anti-phospho-KDR/Flk-1/VEGFR2 (Tyr1214)		H M	WB	Pur	Rb IgG	200 µg	07-374
Anti-VEGF Receptor-3		H	WB IC IH(P)	Pur	Rb	100 µg	AB1875
Anti-VEGF Receptor-3		M	ELISA WB	APur	Rb	50 µg	AB3127
Anti-VEGF Receptor-2, phospho-specific (Tyr996)		H	IP WB	APur	Rb	100 µL	AB3847
Anti-Flt-3, extracellular region		H M	FC IP WB IC		Rb IgG	200 µg	06-646
Anti-Flt-3, cytoplasmic domain		H M	IP WB IC		Rb IgG	200 µg	06-647
Protein							
VEGF, recombinant			CULT			10 µg	01-185
Vascular Endothelial Growth Factor, recombinant human, 165aa isoform				Pur		10 µg	GF025
Vascular Endothelial Growth Factor 164, recombinant mouse				Pur		10 µg	GF060
Flt-3 Ligand, recombinant human		H		Pur		10 µg	GF038
VEGF Receptor-3, control peptide for AB3127			PIA	Pur		100 µg	AG659
siRNA							
VEGF *SMARTpool* siRNA reagent		H	RNAi			5 nmol	M-003550
KDR/Flk-1/VEGFR2 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-104
KDR/Flk-1/VEGFR2 *SMARTpool* siRNA reagent			RNAi			5 nmol	M-003148
Flt-1 *SMARTpool* siRNA reagent		H	RNAi			5 nmol	M-003136
Flt-3 *SMARTpool* siRNA reagent			RNAi			5 nmol	M-003137
Flt-3 siRNA/siAb Assay Kit		H	WB RNAi			1 kit	60-106
Assay							
ChemiKine™ Vascular Endothelial Growth Factor, Competitive ELISA		H R	ELISA			1 kit	CYT132
ChemiKine Vascular Endothelial Growth Factor, Competitive ELISA		M	ELISA			1 kit	CYT133
ChemiKine Vascular Endothelial Growth Factor, Sandwich ELISA		H	ELISA			1 kit	CYT214

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