





# Chemokine Signaling Pathway

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Chemokines are small proteins, usually ~70–80 amino acid residues, with conserved sequence and structural features and expressed in tissues during normal immune surveillance or in response to injury or infection.

Chemokines are defined by their primary amino acid sequence and the arrangement of specific structurally important cysteine residues within the mature protein. Variation in the precise configuration of the two cysteines closest to the N terminus allows chemokines to be split into four subfamilies: CC, CXC, CX3C, and XC. In CC chemokines, these cysteines are directly juxtaposed, while CXC chemokines have a single variable amino acid between them. The sole CX3C chemokine has three amino acids between these two cysteines, while XC chemokines, of which there are two forms in humans and one in mice, lack the first and the third cysteines of the motif.

Chemokines are designated according to their subfamily classification by systematic names composed of a prefix (CCL, CXCL, CX3CL, or XCL; “L” signifies a ligand as opposed to a receptor) followed by an identifying number.

Chemokines bind and activate chemokine receptors, G protein-coupled receptors (GPCRs) embedded in the cell membranes of leukocytes, thereby inducing leukocyte adhesion to the vessel wall, morphological changes, extravasation into the inflamed tissue, and chemotaxis along the chemokine gradient to the site of injury or infection.

Mammalian genomes each encode approximately 20 chemokine receptors. Because the receptors were discovered after the chemokines and most of them are selective for members of one chemokine subfamily, they are classified according to the subfamily of chemokines to which most of their ligands belong. Thus, receptors are named using the prefixes CCR, CXCR, CX3CR, and XCR followed by an identifying number.

A given chemokine can stimulate different responses depending on the receptor to which it binds as well as on the cells where the receptors are expressed.

Chemokine signaling is essential for coordinated cell migration in health and disease to specifically govern cell positioning in space and time. Typically, chemokines signal through heptahelical GPCRs to orchestrate cell migration.

Different subsets of leukocytes express different arrays of chemokine receptors, enabling them to respond to the appropriate ligands. Most chemokines bind and activate several receptors. Similarly, most chemokine receptors respond to multiple chemokine ligands. This selectivity of recognition is an intrinsic property of the chemokine-receptor pair. However, selectivity can be altered by modification of the proteins

The interactions of chemokines with their G protein-coupled receptors promote the migration of leukocytes during normal immune function and as a key aspect of the inflammatory response to tissue injury or infection. Upon activation, GPCRs become desensitized through phosphorylation of their intracellular C-termini by second messenger-dependent kinases and GPCR kinases (GRKs). The phosphorylation pattern, also known as barcode, induces arrest in recruitment to the receptor.

Typically, chemokine receptor stimulation leads to the GDP/GTP exchange of coupled heterotrimeric G<sub>i</sub>

proteins and the subsequent dissociation of the  $\beta\gamma$  subunits, which then activate phosphoinositide-specific phospholipase C $\beta$  (PLC) and phosphoinositide 3-kinase (PI3K). PLC produces inositol-trisphosphate (IP3) and diacylglycerol (DAG). IP3 triggers calcium mobilization whereas DAG activates protein kinase C (PKC). PI3K generates 3-phosphoinositides, which serve as anchors in the recruitment of proteins with pleckstrin homology domains to the plasma membrane, such as AKT/PKB. Although these signaling events are common to all chemokine receptors, it is well known that the activation of further downstream pathways is quite different. This may depend on the efficacy with which a chemokine triggers its receptor, giving rise to different spatial and temporal signal fluxes.

By far the most studied function of the chemokine network is cell migration, particularly of leukocytes. In addition to their roles in leukocyte trafficking, chemokine activation of chemokine receptors can give rise to a variety of additional cellular and tissue responses, including proliferation, activation, differentiation, extracellular matrix remodeling, angiogenesis, and tumor metastasis.

As recently reviewed elsewhere, a wide variety of other biological processes can be induced by the activation of cCKRs on leukocytes, including proliferation, survival, differentiation, cytokine production, degranulation, and respiratory burst. Moreover, several chemokines have direct antimicrobial activity. In addition, many nonleukocytic cell types, including neurons, astrocytes, epithelial cells, mesenchymal cells, and endothelial cells, can express cCKRs and respond in a wide variety of ways to chemokines

### Featured Protein Products Related to Chemokine Signal Pathway

Group	Cat.No.	Product Name	Tag	Species	Source
PLCB1	PLCB1-7157H	Recombinant Human PLCB1 protein, His & T7-tagged	HisIT7	Human	E.coli
	PLCB1-831H	Recombinant Human PLCB1	His	Human	Mammalian Cell
PLCB2	PLCB2-8262H	Recombinant Human PLCB2 protein, His & T7-tagged	HisIT7	Human	E.coli
PLCB3	PLCB3-1763H	Recombinant Human PLCB3, GST-tagged	GST	Human	E.coli
	PLCB3-27922TH	Recombinant Human PLCB3, His-tagged	His	Human	E.coli
PLCB4	PLCB4-8265H	Recombinant Human PLCB4 protein, His & T7-tagged	HisIT7	Human	E.coli
DAG1	DAG1-2327H	Recombinant Human DAG1 Protein, GST-tagged	GST	Human	Wheat Germ
	DAG1-549H	Recombinant Human DAG1 Protein, His-tagged	His	Human	NSO
	DAG1-620H	Recombinant Human DAG1 Protein, His-tagged	His	Human	HEK293

Group	Cat.No.	Product Name	Tag	Species	Source
PRRT2	PRRT2-5035H	Recombinant Human PRRT2, His-tagged	His	Human	E.coli
	PRRT2-13489M	Recombinant Mouse PRRT2 Protein	His	Mouse	Mammalian Cell
FAK	FAK-12647H	Recombinant Human FAK, His-tagged	His	Human	E.coli
PXN	PXN-029H	Recombinant Human PXN Protein, Trx, His and S-tags-tagged	Trx His S	Human	E.coli
	PXN-030H	Recombinant Human PXN Protein, His-tagged	His	Human	E.coli
	PXN-2413H	Recombinant Human Paxillin, GST-tagged	GST	Human	E.coli
CRK	CRK-1886H	Recombinant Human CRK Protein, GST-tagged	GST	Human	Wheat Germ
	CRK-27823TH	Recombinant Human CRK, His-tagged	His	Human	E.coli
BCAR1	BCAR1-120H	Recombinant Human BCAR1 Protein, GST-tagged	GST	Human	Wheat Germ
	BCAR1-5042H	Recombinant Human BCAR1, His-tagged	His	Human	E.coli
NFKB1	NFKB1-120H	Recombinant Human NFKB1 protein, T7/His-tagged	T7 His	Human	E.coli
	NFKB1-1847H	Recombinant Human NFKB1 protein, His & GST-tagged	His GST	Human	E.coli
	NFKB1-300H	Recombinant Human NFKB1 protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
	NFKB1-309H	Recombinant Human NFKB1 protein, His/MBP-tagged	His MBP	Human	E.coli
	NFKB1-633H	Recombinant Human NFKB1, His-tagged	His	Human	Sf21 Insect Cell
	NFKB1-85H	Recombinant Human NFkB-p50 protein, active, GST-tagged	GST	Human	E.coli
NFKB2	NFKB2-306H	Recombinant Human NFKB2 protein, His/MBP-tagged	His MBP	Human	E.coli
	NFKB2-4859	Recombinant Human NFKB2 protein, GST-tagged	GST	Human	Insect Cell
	NFKB2-815H	Recombinant Human NFKB2 Protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
NFKBIB	NFKBIB-161H	Recombinant Human NFKBIB protein, His/MBP-tagged	His MBP	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
	NFKBIB-28874TH	Recombinant Human NFKBIB, His-tagged	His	Human	E.coli
	NFKBIB-4862	Recombinant Human NFKBIB protein, GST-tagged	GST	Human	E.coli
IKK	Kit-0475	IKK-alpha/beta Kinase (Human) Assay/Inhibitor Screening Assay Kit	N/A		
PREX1	PREX1-13334M	Recombinant Mouse PREX1 Protein	His	Mouse	Mammalian Cell
RAC1	RAC1-193H	Recombinant Human RAC1(Y72C) protein, His-tagged	His	Human	E.coli
	RAC1-194H	Recombinant Human RAC1 protein, His-tagged	His	Human	E.coli
	RAC1-2213H	Recombinant Human RAC1, GST tagged	GST	Human	Insect Cell
	RAC1-445H	Recombinant Human RAC1 Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
RAC2	RAC2-2148H	Recombinant Human RAC2, GST-tagged	GST	Human	E.coli
	RAC2-2549H	Recombinant Human RAC2, His tagged	His	Human	E.coli
RAC3	RAC3-31284TH	Recombinant Human RAC3	N/A	Human	E.coli
	RAC3-13859M	Recombinant Mouse RAC3 Protein	His	Mouse	Mammalian Cell
MAPK1	MAPK1-2008H	Recombinant Human MAPK1 Protein, GST-tagged	GST	Human	E.coli
	MAPK1-27H	Biotinylated Recombinant Human ERK2, His-tagged	His	Human	E.coli
	MAPK1-385H	Recombinant Human MAPK1 Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
JNK	JNK-211H	Recombinant Human JNK, GST-tagged	GST	Human	E.coli
MAPK8	MAPK8-100H	Recombinant Human MAPK8, His-tagged	His	Human	E.coli
	MAPK8-156H	Recombinant Human MAPK8 protein, His/MBP-tagged	HisIMBP	Human	E.coli
	MAPK8-781H	Recombinant Human MAPK8, GST tagged	GST	Human	Insect Cell

Group	Cat.No.	Product Name	Tag	Species	Source
MAPK9	MAPK9-1052H	Recombinant Human Mitogen-Activated Protein Kinase 9, GST-Tagged	GST	Human	Sf9 Insect Cell
	MAPK9-617H	Recombinant Human MAPK9, His tagged	His	Human	Insect Cell
MAPK10	MAPK10-154H	Recombinant Human MAPK10 protein, His/MBP-tagged	HisIMBP	Human	E.coli
	MAPK10-239H	Recombinant Human MAPK10 protein, His-tagged	His	Human	E.coli
	MAPK10-339H	Recombinant Human MAPK10, GST-tagged, Active	GST	Human	Sf9 Insect Cell
PAK1	PAK1-378H	Recombinant Human PAK1, GST-tagged, Active	GST	Human	Sf9 Insect Cell
	PAK1-768H	Recombinant Human PAK1 Protein, His-tagged	His	Human	E.coli
PAK2	PAK2-721H	Recombinant Human PAK2, GST-His	GST	Human	Sf9 Insect Cell
	PAK2-767H	Recombinant Human PAK2 Protein, His-tagged	His	Human	E.coli
PAK3	PAK3-1354H	Recombinant Human PAK3, His tagged	His	Human	Insect Cell
	PAK3-379H	Recombinant Human PAK3, GST-tagged, Active	GST	Human	Sf9 Insect Cell
PAK4	PAK4-1283H	Recombinant Human p21 Protein (Cdc42/Rac)-Activated Kinase 4, GST-tagged	GST	Human	Insect Cell
	PAK4-18H	Recombinant Human PAK4	N/A	Human	E.coli
	PAK4-69H	Recombinant Human PAK4 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
PAK6	PAK6-32H	Recombinant Human PAK6 protein, GST-tagged	GST	Human	Wheat Germ
PAK7	PAK7-1515H	Recombinant Human PAK7, GST-tagged	GST	Human	E.coli
LIMK1	LIMK1-1029H	Recombinant Human LIMK1, GST-tagged	GST	Human	Sf9 Insect Cell
	LIMK1-321H	Recombinant Human LIMK1 protein, GST-tagged	GST	Human	Wheat Germ

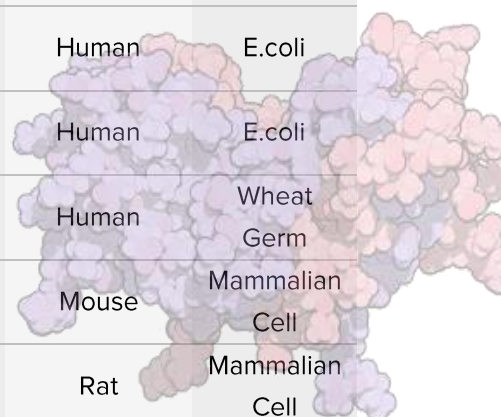
Group	Cat.No.	Product Name	Tag	Species	Source
LIMK2	LIMK2-382H	Recombinant Human LIMK2 Protein, GST/His-tagged	GSTHis	Human	E.coli
VAV1	VAV1-163H	Recombinant Human VAV1, GST-tagged	GST	Human	Sf9 Insect Cell
	VAV1-3652H	Recombinant Human VAV1, His-tagged	His	Human	E.coli
	VAV1-411H	Recombinant Human VAV1 Protein, His/GST-tagged	His GST	Human	E.coli
VAV2	VAV2-3653H	Recombinant Human VAV2, GST-tagged	GST	Human	E.coli
VAV3	VAV3-119H	Recombinant Human VAV3 Protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
	VAV3-1385H	Recombinant Human VAV3 protein, His-tagged	His	Human	E.coli
CDC42	CDC42-0934H	Recombinant Human CDC42 Protein, GST-Tagged	GST	Human	Wheat Germ
	CDC42-0936H	Recombinant Human CDC42 Protein, GST-pstS1-Tagged	GST pstS1	Human	Wheat Germ
	CDC42-2634H	Recombinant Human CDC42 protein, His-tagged	His	Human	E.coli
	CDC42-2636H	Recombinant Human CDC42(T17N) protein, GST-tagged	GST	Human	E.coli
	CDC42-2637H	Recombinant Human CDC42(Q61L) protein, His-tagged	His	Human	E.coli
	CDC42-26651TH	Recombinant Human CDC42, T7 -tagged	T7	Human	E.coli
WAS	WAS-139H	Recombinant Human WAS Protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
	WAS-1969H	Recombinant Human WAS protein, His-tagged	His	Human	E.coli
	WAS-721H	Recombinant Human WAS Protein, GST-tagged	GST	Human	E.coli
ACTR2	ACTR2-236H	Recombinant Human ACTR2 Protein, GST-tagged	GST	Human	Wheat Germ
	ACTR2-26394TH	Recombinant Human ACTR2	N/A	Human	Wheat Germ
ACTR3	ACTR3-237H	Recombinant Human ACTR3 Protein, GST-tagged	GST	Human	Wheat Germ
	ACTR3-658H	Recombinant Human ACTR3 Protein, His&GST-tagged	His GST	Human	Insect Cell



Group	Cat.No.	Product Name	Tag	Species	Source
RHOA	RHOA-1182H	Recombinant Human RHOA Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	RHOA-179H	Recombinant Human RHOA, His-tagged	His	Human	E.coli
	RHOA-2290H	Recombinant Human RHOA, GST-tagged	GST	Human	E.coli
ROCK1	ROCK1-1480H	Recombinant Human ROCK1 (Active), GST-tagged	GST	Human	Sf9 Insect Cell
	ROCK1-76H	Recombinant Human ROCK1 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
ROCK2	ROCK2-1879H	Recombinant Human ROCK2 Protein, His-tagged	His	Human	Insect cells
	ROCK2-1878H	Recombinant Human ROCK2 protein, His & T7-tagged	His/T7	Human	E.coli
	ROCK2-26H	Recombinant Human ROCK2 protein, GST-tagged	GST	Human	Insect Cell
	ROCK2-672H	Recombinant Human ROCK2 protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
PIK3CA	PIK3CA&PIK3R1-150H	Recombinant Human PIK3CA(E545K)/PIK3R1 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CA&PIK3R1-151H	Recombinant Human PIK3CA(N345K)/PIK3R1 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CA&PIK3R1-152H	Recombinant Human PIK3CA(E542K)/PIK3R1 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CA&PIK3R1-153H	Recombinant Human PIK3CA/PIK3R1 protein, GST-tagged, Active	GST	Human	Insect Cell
	PIK3CA&PIK3R1-154H	Recombinant Human PIK3CA/PIK3R1 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CA&PIK3R3-152H	Recombinant Human PIK3CA/PIK3R3 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CA-70H	Recombinant Human PIK3CA protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell

Group	Cat.No.	Product Name	Tag	Species	Source
PIK3CB	PIK3CB&PIK3R1-155H	Recombinant Human PIK3CB/PIK3R1 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CB&PIK3R2-156H	Recombinant Human PIK3CB/PIK3R2 protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CB-1724H	Recombinant Human PIK3CB protein, His-tagged	His	Human	E.coli
	PIK3CB-214H	Recombinant Human PIK3CB	N/A	Human	Sf9 Insect Cell
PIK3CD	PIK3CD-1727H	Recombinant Human PIK3CD protein, His & T7-tagged	HisIT7	Human	E.coli
	PIK3CD-52H	Recombinant Human PIK3CD, GST-tagged	GST	Human	Sf9 Insect Cell
PIK3CG	PIK3CG-158H	Recombinant Human PIK3CG protein, His-tagged, Active	His	Human	Insect Cell
	PIK3CG-31759TH	Recombinant Human PIK3CG & PIK3R5 protein	N/A	Human	Insect Cell
	PIK3CG-53H	Recombinant Human PIK3CG, His-tagged	His	Human	Sf9 Insect Cell
	PIK3CG-55H	Recombinant Human PIK3CG, GST-tagged	GST	Human	Sf9 Insect Cell
MLC	MLC-240H	Native Human Myosin Light Chain	N/A	Human	Human Heart
PDK1	PDK1-124H	Recombinant Human PDK1 Protein, GST-tagged	GST	Human	Insect cells
	PDK1-824H	Recombinant Human PDK1 Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
	PDK1-904H	Recombinant Human PDK1, His tagged	His	Human	Insect Cell
AKT1	AKT1-14H	Recombinant Human AKT1 Protein, His-tagged	His	Human	Insect Cell
	AKT1-001H	Recombinant Human AKT1 Protein, His-GST-tagged	6xHis-GST	Human	E.coli
	AKT1-336H	Recombinant Human AKT1 protein, His/Strep-tagged	HisIStrep	Human	HEK293
	Akt1-566M	Recombinant Mouse Akt1 Protein, MYC/DDK-tagged	MYC/DDK	Mouse	HEK293T
	AKT1-101H	Recombinant Human AKT1, GST-tagged	GST	Human	Sf9 Insect Cell

Group	Cat.No.	Product Name	Tag	Species	Source
	AKT1-30H	Recombinant Human AKT1 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
AKT2	AKT2-102H	Recombinant Human AKT2, GST-tagged, Active	GST	Human	Sf9 Insect Cell
	AKT2-165H	Recombinant Human AKT2, His-tagged	His	Human	Insect Cell
	AKT2-1841H	Recombinant Human AKT2 protein, His & T7-tagged	HisIT7	Human	E.coli
	AKT2-248H	Recombinant Human AKT2 Protein, His & GST-tagged	HisIGST	Human	Insect Cell
	AKT2-31H	Recombinant Human AKT2 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
AKT3	AKT3-131H	Recombinant Human AKT3, GST tagged	GST	Human	Insect Cell
	Akt3-159H	Recombinant Human Akt3, His-tagged	His	Human	E.coli
	AKT3-308H	Recombinant Human AKT3 protein, His/MBP-tagged	HisIMBP	Human	E.coli
	AKT3-427H	Recombinant Human AKT3 Protein, GST-tagged	GST	Human	Wheat Germ
TSC1	TSC1-17473M	Recombinant Mouse TSC1 Protein	His	Mouse	Mammalian Cell
	TSC1-6309R	Recombinant Rat TSC1 Protein	His	Rat	Mammalian Cell
TSC2	TSC2-31631TH	Recombinant Human TSC2, His-tagged	His	Human	E.coli
RHEB	RHEB-1181H	Recombinant Human RHEB Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
	RHEB-2289H	Recombinant Human RHEB, His-tagged	His	Human	E.coli
FOXO1	FOXO1-146H	Recombinant Human FOXO1 protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
	FOXO1-147H	Recombinant Human FOXO1 protein, His-tagged	His	Human	E.coli
	FOXO1-4469H	Recombinant Human FOXO1 Protein, GST-tagged	GST	Human	Wheat Germ
FOXO3	FOXO3-28110TH	Recombinant Human FOXO3	N/A	Human	Wheat Germ
	FOXO3-2811H	Recombinant Human FOXO3, MYC/DDK-tagged	MycIDDK	Human	HEK293



Group	Cat.No.	Product Name	Tag	Species	Source
	FOXO3-4471H	Recombinant Human FOXO3 Protein, GST-tagged	GST	Human	Wheat Germ
	FOXO3-7633H	Recombinant Human FOXO3 protein, His & T7-tagged	HisIT7	Human	E.coli
FOXO4	FOXO4-099H	Recombinant Human FOXO4 Protein, HIS-tagged	HIS	Human	E.coli
FOXO6	FOXO6-6009M	Recombinant Mouse FOXO6 Protein	His	Mouse	Mammalian Cell
RPS6KB1	RPS6KB1-13H	Recombinant Human RPS6KB1 Protein, His-tagged	His	Human	E.coli
	RPS6KB1-195H	Recombinant Human RPS6KB1, GST-tagged	GST	Human	Sf9 Insect Cell
RPS6KB2	RPS6KB2-1935H	Recombinant Human RPS6KB2 protein, His & GST-tagged	His GST	Human	E.coli
	RPS6KB2-2437H	Recombinant Human RPS6KB2, His-tagged	His	Human	E.coli
	RPS6KB2-377H	Recombinant Human RPS6KB2, GST-tagged, Active	GST	Human	Sf9 Insect Cell
RPS6	RPS6-307H	Recombinant Human RPS6, GST-tagged	GST	Human	Wheat Germ
EIF4E	EIF4E-26389TH	Recombinant Human EIF4E protein, His-tagged	His	Human	E.coli
	EIF4E-3198H	Recombinant Human EIF4E Protein, GST-tagged	GST	Human	Wheat Germ
GSK3B	GSK3B-2129H	Recombinant Human GSK3B Protein (1-420 aa), His-tagged	His	Human	Yeast
	GSK3B-120H	Recombinant Human GSK3B Protein, DDK-tagged	DDK	Human	Insect Cell
	GSK3B-2350H	Recombinant Human GSK3B Protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
	GSK3B-2857H	Recombinant Human GSK3B (C-79aa), His-tagged	His	Human	E.coli
	GSK3B-2858H	Recombinant Human GSK3B (1-351aa), His-tagged	His	Human	E.coli
	GSK3B-326H	Recombinant Human GSK3B protein, GST-tagged	GST	Human	Insect Cell
BAD	BAD-048H	Recombinant Human BAD protein, GST-tagged	GST	Human	Wheat Germ
	BAD-168H	Recombinant Human v protein, His-tagged	His	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
CASP9	CASP9-0433H	Recombinant Human CASP9 Protein, GST-Tagged	GST	Human	Wheat Germ
	CASP9-148H	Recombinant Human CASP9 Protein, His-tagged	His	Human	E.coli
	CASP9-48H	Recombinant Human CASP9 protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
ADCY1	ADCY1-6841H	Recombinant Human ADCY1 protein, His & T7-tagged	HisIT7	Human	E.coli
ADCY2	ADCY2-3167H	Recombinant Human ADCY2, His-tagged, T7 tagged	HisIT7	Human	E.coli
	ADCY2-327H	Recombinant Human ADCY2 Protein, GST-tagged	GST	Human	Wheat Germ
ADCY3	ADCY3-3173H	Recombinant Human ADCY3, His-tagged	His	Human	E.Coli or Yeast
	ADCY3-328H	Recombinant Human ADCY3 Protein, GST-tagged	GST	Human	Wheat Germ
	ADCY3-6925H	Recombinant Human ADCY3 protein, His & T7-tagged	HisIT7	Human	E.coli
Adcy4	Adcy4-6926M	Recombinant Mouse Adcy4 protein, His & T7-tagged	HisIT7	Mouse	E.coli
ADCY5	ADCY5-329H	Recombinant Human ADCY5 Protein, GST-tagged	GST	Human	Wheat Germ
	ADCY5-6927H	Recombinant Human ADCY5 protein, His & T7-tagged	HisIT7	Human	E.coli
ADCY6	ADCY6-9410H	Recombinant Human ADCY6 protein, His-tagged	His	Human	E.coli
	ADCY6-330H	Recombinant Human ADCY6 Protein, GST-tagged	GST	Human	Wheat Germ
ADCY7	ADCY7-331H	Recombinant Human ADCY7 Protein, GST-tagged	GST	Human	Wheat Germ
	ADCY7-6932H	Recombinant Human ADCY7 protein, His & T7-tagged	HisIT7	Human	E.coli
ADCY8	ADCY8-3182H	Recombinant Human ADCY8, His-tagged	His	Human	E.Coli or Yeast
	ADCY8-332H	Recombinant Human ADCY8 Protein, GST-tagged	GST	Human	Wheat Germ
	ADCY8-6934H	Recombinant Human ADCY8 protein, His & GST-tagged	HisIGST	Human	E.coli
ADCY9	ADCY9-3168H	Recombinant Human ADCY9, His-tagged, T7 tagged	HisIT7	Human	E.coli
	ADCY9-9411H	Recombinant Human ADCY9, His-tagged	His	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
ADCY10	ADCY10-516R	Recombinant Rat ADCY10 Protein	His	Rat	Mammalian Cell
SRC	SRC-1100H	Recombinant Human SRC protein, GST-tagged	GST	Human	E.coli
	SRC-1358H	Recombinant Human SRC protein, His/GST-tagged	His GST	Human	Insect Cell
	SRC-22H	Recombinant Human SRC protein, His-tagged	His	Human	E.coli
	SRC-2747H	Recombinant Human SRC Protein, MYC/DDK-tagged	Myc DDK	Human	HEK293
	SRC-79H	Recombinant Human SRC protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
ELMO1	ELMO1-3251H	Recombinant Human ELMO1 Protein, GST-tagged	GST	Human	Wheat Germ
DOCK2	DOCK2-2805H	Recombinant Human DOCK2 Protein, GST-tagged	GST	Human	Wheat Germ
	DOCK2-402H	Recombinant Human DOCK2 Protein, His-tagged	His	Human	E.coli
SHC1	SHC1-2654H	Recombinant Human SHC1, GST-tagged	GST	Human	E.coli
	SHC1-30065TH	Recombinant Human SHC1, His-tagged	His	Human	E.coli
Shc2	Shc2-1745M	Recombinant Mouse Shc2 protein, His & T7-tagged	His T7	Mouse	E.coli
SHC3	SHC3-1277H	Recombinant Human SHC3 protein, His & GST-tagged	His GST	Human	E.coli
	SHC3-2655H	Recombinant Human SHC3, GST-tagged	GST	Human	E.coli
SHC4	SHC4-2656H	Recombinant Human SHC4, GST-tagged	GST	Human	E.coli
GRB2	GRB2-001H	Recombinant Human GRB2 Protein, His-GST-tagged	His/GST	Human	E.coli
	GRB2-127H	Recombinant Human GRB2 protein, T7/His-tagged	T7 His	Human	E.coli
	GRB2-13520H	Recombinant Human GRB2, GST-tagged	GST	Human	E.coli
	GRB2-435H	Recombinant Human GRB2 protein, His-tagged	His	Human	HEK293F
SOS1	SOS1-5322Z	Recombinant Zebrafish SOS1	His	Zebrafish	Mammalian Cell

Group	Cat.No.	Product Name	Tag	Species	Source
SOS2	SOS2-4409R	Recombinant Rhesus monkey SOS2 Protein, His-tagged	His	Rhesus Macaque	Mammalian Cell
KRAS	KRAS-358H	Recombinant Human KRAS Protein, His-tagged	His	Human	E. coli
	KRAS-163H	Recombinant Human KRAS protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	KRAS-4888H	Recombinant Human KRAS Protein, GST-tagged	GST	Human	Wheat Germ
ERAS	ERAS-1261H	Recombinant Human ERAS Protein (3-230 aa), His-tagged	His	Human	E.coli
	ERAS-3440H	Recombinant Human ERAS Protein, GST-tagged	GST	Human	Wheat Germ
MRAS	MRAS-5533H	Recombinant Human MRAS Protein, GST-tagged	GST	Human	Wheat Germ
	MRAS-703H	Recombinant Human MRAS (Q71L) Protein, His-tagged	His	Human	E.coli
NRAS	NRAS-165H	Recombinant Human NRAS protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	NRAS-447H	Recombinant Human NRAS Protein, His-tagged	His	Human	E.coli
	NRAS-6106H	Recombinant Human NRAS Protein, GST-tagged	GST	Human	Wheat Germ
RAF1	RAF1-1123H	Recombinant Human RAF1 Protein, GST-tagged	GST	Human	E.coli
	RAF1-413H	Recombinant Human RAF1 Protein (Ser306-Phe648), His-GST-tagged	His/GST	Human	Insect Cell
	RAF1-169H	Recombinant Human RAF1 protein, His-tagged	His	Human	Insect Cell
	RAF1-552H	Recombinant Human RAF1, MYC/DDK-tagged	MycI/DDK	Human	HEK293
MAP2K1	MAP2K1-167H	Recombinant Human v protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	MAP2K1-175H	Recombinant Human MAP2K1, GST-tagged	GST	Human	E.coli
	MAP2K1-2568H	Recombinant Human MAP2K1, His-tagged	His	Human	Insect Cell
	MAP2K1-299H	Recombinant Human MAP2K1 protein, His/MBP-tagged	His/MBP	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
	MAP2K1-62H	Recombinant Human MAP2K1 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
ERK1	ERK1-12538H	Recombinant Human ERK1, His-tagged	His	Human	E.coli
MAPK1	MAPK1-2008H	Recombinant Human MAPK1 Protein, GST-tagged	GST	Human	E.coli
	MAPK1-28700TH	Recombinant Human MAPK1, His-tagged	His	Human	E.coli
	MAPK1-385H	Recombinant Human MAPK1 Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
RPS6KA1	RPS6KA1-1934H	Recombinant Human RPS6KA1 protein, His & T7-tagged	HisIT7	Human	E.coli
	RPS6KA1-2432H	Recombinant Human RPS6KA1, GST-tagged	GST	Human	E.coli
ARRB1	ARRB1-026H	Recombinant Human ARRB1 Protein, His-tagged	His	Human	E.coli
	ARRB1-278H	Recombinant Human ARRB1, MYC/DDK-tagged	MycIDDK	Human	HEK293
	ARRB1-9892H	Recombinant Human ARRB1, GST-tagged	GST	Human	E.coli
ARRB2	ARRB2-26621TH	Recombinant Human ARRB2	N/A	Human	Wheat Germ
	ARRb2-3639H	Recombinant Human ARRB2, His-tagged, GST-tagged	HisIGST	Human	E.coli
	ARRB2-855H	Recombinant Human ARRB2 protein, GST-tagged	GST	Human	Wheat Germ
GRK1	GRK1-5352H	Recombinant Human GRK1 Protein, GST-tagged	GST	Human	Wheat Germ
GRK4	GRK4-392H	Recombinant Human GRK4 Protein, His-tagged	His	Human	E.coli
	GRK4-5354H	Recombinant Human GRK4 Protein, GST-tagged	GST	Human	Wheat Germ
GRK5	GRK5-13541H	Recombinant Human GRK5, His-tagged	His	Human	E.coli
	GRK5-1410H	Recombinant Human GRK5 (Active), GST-tagged	GST	Human	Sf9 Insect Cell
	GRK5-2359H	Recombinant Human GRK5 Protein, MYC/DDK-tagged	MycIDDK	Human	HEK293
GRK6	GRK6-13542H	Recombinant Human GRK6, GST-tagged	GST	Human	E.coli



Group	Cat.No.	Product Name	Tag	Species	Source
	GRK6-2360H	Recombinant Human GRK6 Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	GRK6-393H	Recombinant Human GRK6 Protein, His-tagged	His	Human	E.coli
GRK7	GRK7-2357H	Recombinant Human GRK7 Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	GRK7-5360H	Recombinant Human GRK7 Protein, GST-tagged	GST	Human	Insect Cell
JAK1	JAK1-1941H	Recombinant Human JAK1 Protein (850-1154 aa), His-tagged	His	Human	Yeast
	JAK1-159H	Recombinant Human JAK1 protein, His/MBP-tagged	His/MBP	Human	E.coli
	JAK1-18H	Recombinant Human JAK1 protein, GST-tagged	GST	Human	Insect Cell
	JAK1-249H	Recombinant Human JAK1	His	Human	Mammalian Cell
	JAK1-28H	Recombinant Human JAK1 protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	JAK1-56H	Recombinant Human JAK1 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
JAK2	JAK2-1420H	Recombinant Human JAK2 (Active), His-tagged	His	Human	Sf9 Insect Cell
	JAK2-157H	Recombinant Human JAK2 protein, His/MBP-tagged	His/MBP	Human	E.coli
	JAK2-26H	Recombinant Human JAK2 protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	JAK2-336H	Recombinant Human JAK2 protein, GST-tagged	GST	Human	Insect Cell
	JAK2-57H	Recombinant Human JAK2 protein, Flag-tagged, Biotinylated	Flag	Human	Insect Cell
JAK3	JAK3-467H	Recombinant Human JAK3 Protein, His-tagged	His	Human	Insect cells
	JAK3-1887H	Recombinant Human Janus Kinase 3, GST-tagged	GST	Human	Insect Cell
	JAK3-32H	Recombinant Human JAK3 protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
STAT1	STAT1-2783H	Recombinant Human STAT1, His-tagged	His	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
	STAT1-2901H	Recombinant Human STAT1 Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	STAT1-2996H	Recombinant Human STAT1, GST-tagged	GST	Human	E.coli
STAT2	STAT2-2515H	Recombinant Human STAT2, His-tagged	His	Human	Insect Cell
	STAT2-2997H	Recombinant Human STAT2, GST-tagged	GST	Human	E.coli
	STAT2-332H	Recombinant Human STAT2 protein, His/MBP-tagged	HisIMBP	Human	E.coli
STAT3	STAT3-001H	Recombinant Human STAT3 Protein, His-tagged	His	Human	Insect cells
	STAT3-1496H	Recombinant Human STAT3, GST-tagged	GST	Human	Sf9 Insect Cell
	STAT3-2174H	Recombinant Human STAT3, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	STAT3-335H	Recombinant Human STAT3 protein, His/MBP-tagged	HisIMBP	Human	E.coli
STAT4	STAT4-2898H	Recombinant Human STAT4 Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	STAT4-338H	Recombinant Human STAT4 protein, His/MBP-tagged	HisIMBP	Human	E.coli
	STAT4-7038H	Recombinant Human STAT4, His tagged	His	Human	Insect Cell
STAT5A	STAT5A-1498H	Recombinant Human STAT5A, His-tagged	His	Human	Sf9 Insect Cell
	STAT5A-340H	Recombinant Human STAT5A protein, His/MBP-tagged	HisIMBP	Human	E.coli
STAT5B	STAT5B-1851H	Recombinant Human STAT5B protein, His & T7-tagged	HisIT7	Human	E.coli
	STAT5B-197H	Recombinant Human STAT5B, His-tagged	His	Human	E.coli
	STAT5B-2902H	Recombinant Human STAT5B Protein, MYC/DDK-tagged	MycI/DDK	Human	HEK293
	STAT5B-2998H	Recombinant Human STAT5B, GST-tagged	GST	Human	E.coli
	STAT5B-343H	Recombinant Human STAT5B protein, His/MBP-tagged	HisIMBP	Human	E.coli

Group	Cat.No.	Product Name	Tag	Species	Source
STAT6	STAT6-2897H	Recombinant Human STAT6 Protein, MYC/DDK-tagged	Myc/DDK	Human	HEK293
	STAT6-30854TH	Recombinant Human STAT6, His-tagged	His	Human	E.coli
	STAT6-344H	Recombinant Human STAT6 protein, His/MBP-tagged	HisIMBP	Human	E.coli
CREB1	CREB1-162H	Recombinant Human CREB1, GST-tagged	GST	Human	E.coli
	CREB1-182H	Recombinant Human CREB1 Protein, His-tagged	His	Human	E.coli
	CREB1-6915H	Recombinant Human CREB1, His & MBP tagged	HisIMBP	Human	E.coli
CREB3	CREB3-1842H	Recombinant Human CREB3 Protein, GST-tagged	GST	Human	Wheat Germ
	CREB3-1020R	Recombinant Rhesus monkey CREB3 Protein, His-tagged	His	Rhesus Macaque	Mammalian Cell
CREB5	CREB5-1112H	Recombinant Human CREB5 protein, His & T7-tagged	HisIT7	Human	E.coli
	CREB5-1850H	Recombinant Human CREB5 Protein, GST-tagged	GST	Human	Wheat Germ
FOS	FOS-4893H	Recombinant Human FOS Protein, His-tagged	His	Human	E. coli
	FOS-32H	Recombinant Human FOS protein, GST-tagged	GST	Human	Wheat Germ
JUN	JUN-105H	Recombinant Human JUN, His-tagged	His	Human	Insect Cell
	JUN-18H	Recombinant Human JUN protein, GST-tagged	GST	Human	Wheat Germ
	JUN-291H	Recombinant Human JUN protein, His/MBP-tagged	HisIMBP	Human	E.coli
ELK1	ELK1-27228TH	Recombinant Human ELK1, C-MYC-tagged	MYC	Human	E.coli
	ELK1-31H	Recombinant Human ELK1, His-tagged, Myc-tagged	HisIMyc	Human	E.coli
	ELK1-3243H	Recombinant Human ELK1 Protein, GST-tagged	GST	Human	Wheat Germ
	ELK1-6922H	Recombinant Human ELK1, His & GST tagged	HisIGST	Human	Insect Cell