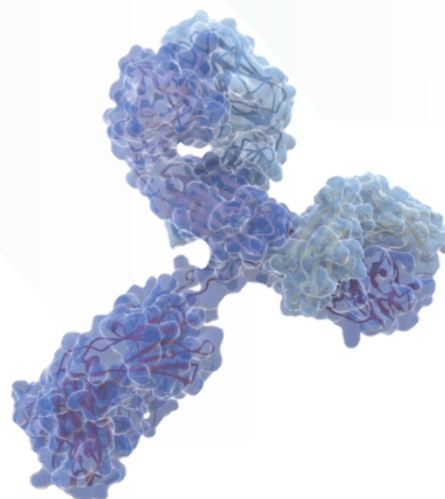
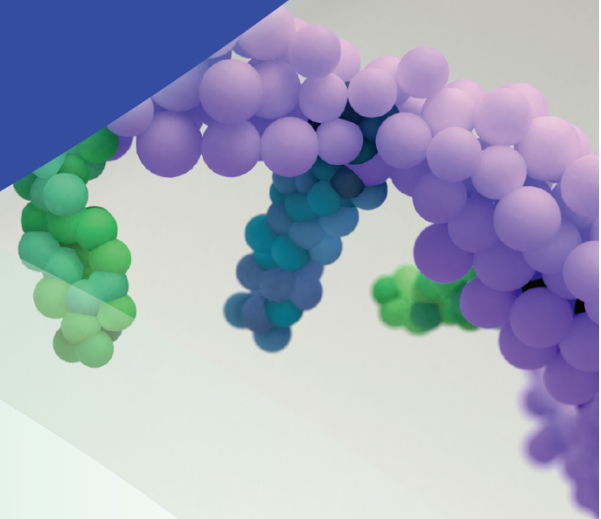


VEGF Signaling Pathway



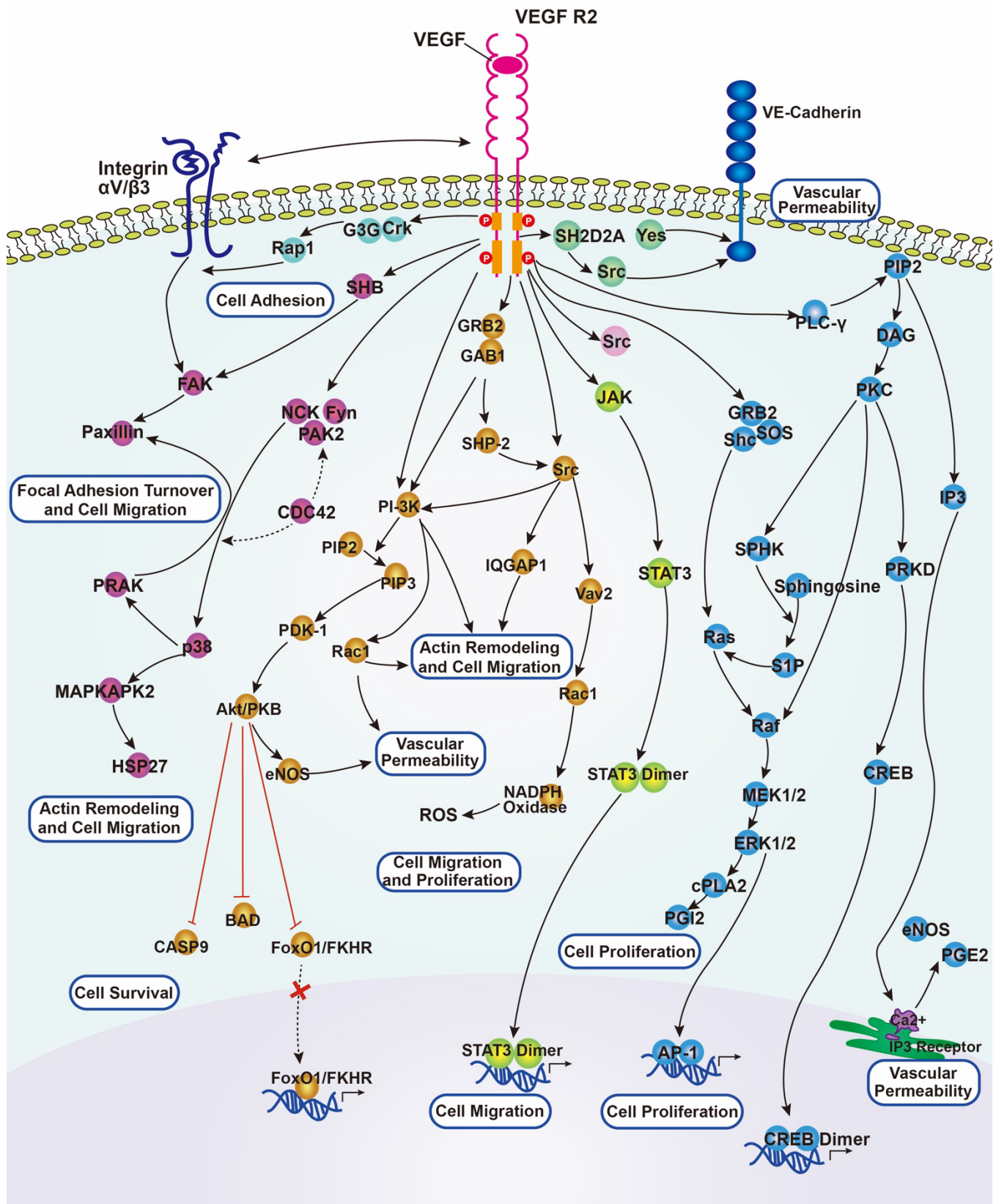
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What is VEGF Signaling Pathway?

VEGF (Vascular Endothelial Growth Factor) signaling pathway is a key signaling network in cell biology, and it plays a crucial role in angiogenesis. Angiogenesis is the formation of new blood vessels from existing vascular systems, a process that is important for a variety of physiological and pathological conditions, including development, wound healing, the female menstrual cycle, pregnancy, and tumor growth.

The core of VEGF signaling pathway is the VEGF protein family, which includes A variety of isoforms, such as VEGF-A, VEGF-B, VEGF-C, VEGF-D, etc. They work by binding to the corresponding Receptor, VEGFR (Vascular Endothelial Growth Factor Receptor). The VEGFR family includes VEGFR1, VEGFR2 and VEGFR3, of which VEGFR2 is the main receptor mediating angiogenesis.

VEGF binding to the extracellular portion of VEGF R2 leads to receptor dimerization, activation of its intracellular tyrosine kinase domains, and autophosphorylation. Major sites of human VEGF R2 phosphorylation have been characterized and include Tyr801, Tyr951, Tyr1054, Tyr1059, Tyr1175, and Tyr1214. Additional phosphorylation sites on VEGF R2 include Tyr1223, Tyr1305, Tyr1309, and Tyr1319, however the function of phosphorylation at these sites is not well-defined.

Autophosphorylation of VEGF R2 on Tyr1054 and Tyr1059 upon receptor dimerization is critical for downstream kinase activity and may be preceded by autophosphorylation on Tyr801. The other major phosphorylation sites on VEGF R2 are necessary for the recruitment of downstream signaling molecules such as Src, SHB, PI 3-K, NCK/Fyn, CDC42, PLC-gamma, GRB2/SOS/Shc, and SH2D2A. Interaction sites on VEGF R2 for the recruitment of GRB2/GAB1, C3G/Crk, and Jak have not been identified.

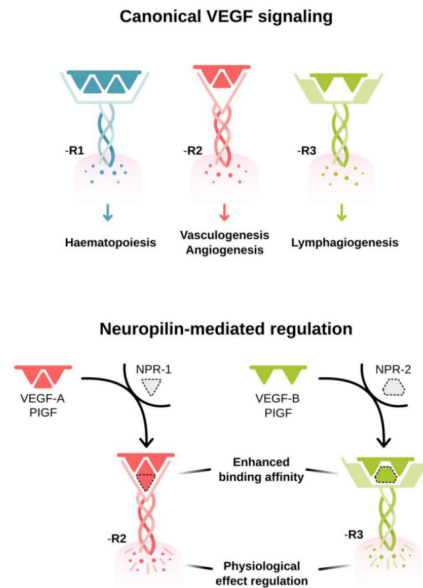


Fig1. VEGF activation and signaling pathways. (Rajendra S Apte, 2019)

Downstream Signaling Cascades

Common downstream signaling cascades initiated by VEGF R2 recruitment of these signaling molecules include the ERK1/2 MAP Kinase, FAK, p38 MAP Kinase, Akt, and Jak-STAT pathways, which result in the activation of a full range of biological responses that regulate angiogenesis including endothelial cell proliferation, survival, adhesion, and migration, as well as vascular permeability.

Ras/RAF/MEK/ERK/MAPK pathway:

After VEGF binds to VEGFR, Ras protein can be activated, which in turn activates RAF, leading to the phosphorylation of MEK and ERK, and ultimately promotes cell proliferation and gene expression.

PI3K/AKT pathway:

VEGF-VEGFR binding also activates phosphatidylinositol-3-kinase (PI3K), which in turn activates AKT (protein kinase B). AKT is involved in regulating a variety of biological processes, including cell survival, proliferation, metabolism, and cell cycle processes.

JAK/STAT pathway:

VEGF signaling also activates Janus kinase (JAK), leading to phosphorylation and activation of signal

transduction and activator of transcription (STAT), which then enters the nucleus and activates target genes.

PLC γ /Ca²⁺ pathway:

The activation of VEGFR can lead to the activation of phospholipase C γ (PLC γ), which produces inositol triphosphate (IP3) and diacylglycerol (DAG) by hydrolyzing phosphatidylinositol 4, 5-diphosphate (PIP2), which cause an increase in intracellular calcium concentration and activation of protein kinase C (PKC), respectively.

FAK/paxillin pathway:

VEGF signaling is also involved in proteins such as adhesion spot kinase (FAK) and paxillin, which are involved in cytoskeleton rearrangement and cell migration.

Roles of VEGF Signaling Pathway

Development and Growth:

VEGF is essential for embryonic development, particularly in the formation of the vascular system. It guides the growth and differentiation of blood vessels during organogenesis.

Wound Healing:

After injury, VEGF is involved in the healing process by stimulating the growth of new blood vessels to the damaged area, which is critical for tissue repair and regeneration.

Tumor Angiogenesis:

In cancer, VEGF signaling is often hijacked by tumors to stimulate the formation of new blood vessels that supply them with oxygen and nutrients, thereby promoting their growth and metastasis.

Inflammation and Immune Response:

VEGF is involved in the inflammatory process by promoting the permeability of blood vessels, allowing the passage of immune cells to the site of inflammation.

Cardiovascular Health:

VEGF influences cardiovascular health by regulating the growth and maintenance of blood vessels, which can impact conditions such as atherosclerosis and hypertension.

Diagnosis and Prognosis:

Measuring VEGF levels can be diagnostically useful in determining the presence and aggressiveness of diseases, as well as providing prognostic information regarding treatment outcomes.

Pathway Related Diseases

Cancer:

VEGF is a key driver of tumor angiogenesis, which is the formation of new blood vessels that supply tumors with the oxygen and nutrients they need to grow. High levels of VEGF are found in many types of cancer, including glioblastoma, non-small cell lung cancer, renal cell carcinoma, and colorectal cancer. Targeting the VEGF pathway can inhibit this process and is a strategy used in several anti-cancer therapies.

Age-Related Macular Degeneration (AMD):

VEGF is involved in the abnormal growth of blood vessels in the retina, which can lead to vision loss in conditions like AMD. Anti-VEGF therapies are used to treat this disease by inhibiting the growth of these vessels.

Diabetic Retinopathy:

Similar to AMD, in diabetic retinopathy, VEGF contributes to the growth of abnormal blood vessels in the retina, which can cause vision impairment. Anti-VEGF treatments are also used in this condition.

Preeclampsia:

This pregnancy complication is characterized by high blood pressure and damage to organs, including the liver and kidneys. VEGF is thought to play a role in the development of preeclampsia by affecting vascular function.

Neurological Conditions:

VEGF has been implicated in several neurological conditions, including epilepsy, brain tumors, stroke, and neuromyelitis optica. It is thought to play a role in neuronal protection and the repair of brain tissue after injury.

Wound Healing and Regeneration:

VEGF is important for normal wound healing and tissue regeneration. However, in some chronic

wounds, such as those seen in diabetes, the balance of VEGF signaling may be disrupted, leading to impaired healing.

Cardiovascular Diseases:

VEGF is involved in the formation of new blood vessels following tissue ischemia, which can be a critical process in the healing of heart tissue after a heart attack. However, dysregulation of VEGF signaling can also contribute to certain cardiovascular diseases.

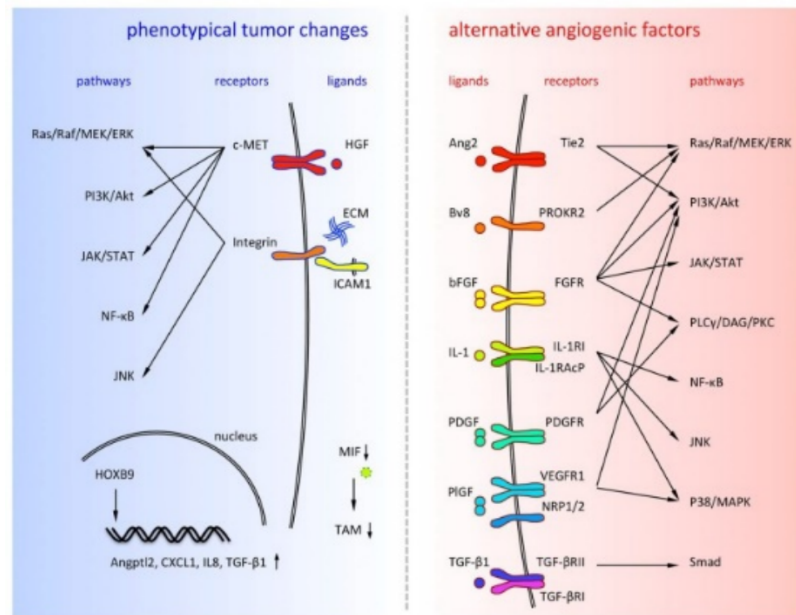


Fig2. Alternative angiogenic factors are listed on the right side and phenotypic tumor changes are listed on the left side. (Yoshiro Itatani, 2018)

VEGF signaling pathway plays a crucial role in a variety of physiological and pathological processes, primarily through its regulation of angiogenesis, which is the formation of new blood vessels from pre-existing ones. Focusing on the life sciences sector, Creative BioMart offers a range of high-quality products related to the VEGF signaling pathway. Please contact us if you have any need.

Group	Cat.No.	Product Name	Source	Species	Tag
AKT1	AKT1-786H	Recombinant Human AKT1, His tagged	Insect Cell	Human	His
	AKT1-3920H	Recombinant Human AKT1 protein, GST-tagged	E.coli	Human	GST
	AKT1-2689H	Recombinant Human AKT1 protein, His-tagged	E.coli	Human	His
	AKT1-786HAF488	Recombinant Human AKT1 Protein, His-tagged, Alexa Fluor 488 conjugated	Insect Cell	Human	His
	AKT1-786HAF555	Recombinant Human AKT1 Protein, His-tagged, Alexa Fluor 555 conjugated	Insect Cell	Human	His
	AKT1-786HAF647	Recombinant Human AKT1 Protein, His-tagged, Alexa Fluor 647 conjugated	Insect Cell	Human	His
	AKT1-786HF	Recombinant Human AKT1 Protein, His-tagged, FITC conjugated	Insect Cell	Human	His
	AKT1-1363H	Active Recombinant Human AKT1, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT1-101H	Active Recombinant Human AKT1, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT1-420H	Active Recombinant Human AKT1 Protein, GST-His tagged	Insect Cell	Human	GST/His
	AKT1-421H	Active Recombinant Human AKT1 Protein, His-tagged	Insect Cell	Human	His
	AKT1-16HFL	Active Recombinant Full Length Human AKT1 Protein, N-His-tagged	Sf21	Human	His
	AKT1-17HFL	Inactive Recombinant Full Length Human AKT1 Protein, N-His-tagged	Sf21	Human	His
	AKT1-15H	Active Recombinant Human AKT1(S473D)(118-end) Mutation Protein, N-His-tagged	Sf21	Human	His
	AKT1-13HFL	Recombinant Human AKT1 Protein, Full Length, N-His tagged	Insect cells	Human	N-His
AKT2	AKT2-163H	Active Recombinant Human AKT2, His-tagged	Sf9 Insect Cell	Human	His
	AKT2-802H	Active Recombinant Human AKT2, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT2-102H	Active Recombinant Human AKT2, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT2-103H	Active Recombinant Human AKT2, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT2-424H	Active Recombinant Human AKT2 Protein, GST-His tagged	Insect Cell	Human	GST/His
	AKT2-1364H	Active Recombinant Human AKT2, His-tagged	Sf9 Insect Cell	Human	His

	AKT2-16H	Active Recombinant Human AKT2(S474D)(120-481) Mutation Protein, N-His-tagged	Sf21	Human	His
	AKT2-260HFL	Active Recombinant Full Length Human AKT2 Protein, C-Flag-tagged	Mammalian cells	Human	Flag
<u>AKT3</u>	AKT3-131H	Recombinant Human AKT3 protein(Met1-Glu479), GST-tagged	Insect Cells	Human	N-GST
	AKT3-01H	Recombinant Human AKT3 Protein, His-tagged	HEK293	Human	His
	AKT3-1365H	Active Recombinant Human AKT3, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT3-804H	Active Recombinant Human AKT3 protein, GST-His-tagged	Insect Cell	Human	GST/His
	AKT3-104H	Active Recombinant Human AKT3, GST-tagged	Sf9 Insect Cell	Human	GST
	AKT3-426H	Active Recombinant Human AKT3 Protein	Insect Cell	Human	N/A
	AKT3-3223M	Active Recombinant Mouse AKT3 protein(Ala106-Glu479)	Insect Cells	Mouse	N/A
	AKT3-17H	Active Recombinant Human AKT3(S472D)(117-end) Mutation Protein, N-His-tagged	Sf21	Human	His
	AKT3-424HFL	Active Recombinant Full Length Human AKT3 Protein, C-Flag-tagged	Mammalian cells	Human	Flag
<u>BAD</u>	BAD-6973H	Recombinant Human BAD, GST-tagged	Sf9 Insect Cell	Human	GST
	BAD-82H	Recombinant Human BCL2-associated Agonist Of Cell Death	E.coli	Human	N/A
	BAD-1433H	Recombinant Human BCL2-associated Agonist Of Cell Death, GST-tagged	Sf9 Insect Cell	Human	GST
	BAD-2269M	Recombinant Mouse BAD Protein	Mammalian Cell	Mouse	His
	BAD-931R	Recombinant Rat BAD Protein	Mammalian Cell	Rat	His
<u>CASP9</u>	CASP9-49H	Active Recombinant Human CASP9 protein	E.coli	Human	N/A
	CASP9-34H	Active Recombinant Human Caspase-9 Enzyme		Human	N/A
	CASP9-35H	Recombinant Human CASP9 Protein, 1-416, C-His tagged	E. coli	Human	C-His
<u>CDC42</u>	CDC42-11008H	Recombinant Human CDC42, GST-tagged	E.coli	Human	GST
	CDC42-2634H	Active Recombinant Human CDC42 protein, His-tagged	E.coli	Human	His
	CDC42-2635H	Active Recombinant Human CDC42 protein, GST-tagged	E.coli	Human	GST

	CDC42-2636H	Active Recombinant Human CDC42(T17N) protein, GST-tagged	E.coli	Human	GST
CREB1	CREB1-26H	Recombinant Human CREB1	E.coli	Human	N/A
	CREB1-6020C	Recombinant Chicken CREB1	Mammalian Cell	Chicken	His
	CREB1-162H	Recombinant Human CREB1, GST-tagged	E.coli	Human	GST
CRK	CRK-11582H	Recombinant Human CRK, GST-tagged	E.coli	Human	GST
	CRK-27823TH	Recombinant Human CRK, His-tagged	E.coli	Human	His
FYN	FYN-0397H	Recombinant Human FYN protein, His-tagged	E.coli	Human	His
	FYN-822HFL	Active Recombinant Full Length Human FYN Protein, C-Flag-tagged	Mammalian cells	Human	Flag
	FYN-70HFL	Active Recombinant Full Length Human FYN Protein, N-His-tagged	Sf21	Human	His
GRB2	GRB2-13520H	Recombinant Human GRB2, GST-tagged	E.coli	Human	GST
	GRB2-28345TH	Recombinant Human GRB2, His-tagged	E.coli	Human	His
JAK1	JAK1-2667H	Recombinant Human JAK1 protein, His-tagged	E.coli	Human	His
	JAK1-18H	Active Recombinant Human JAK1 protein, GST-tagged	Insect Cell	Human	GST
	JAK1-670H	Active Recombinant Human JAK1, GST-tagged	Sf9 Insect Cell	Human	GST
	JAK1-115H	Active Recombinant Human JAK1(866-end) Protein, N-GST-tagged	Sf21	Human	GST
JAK2	JAK2-254H	Recombinant Human JAK2 Protein, His-tagged	E.coli	Human	His
	Jak2-255M	Recombinant Mouse Jak2 Protein, His-tagged	E.coli	Mouse	His
	Jak2-257R	Recombinant Rat Jak2 Protein, His-tagged	E.coli	Rat	His
	JAK2-336H	Active Recombinant Human JAK2 protein, GST-tagged	Insect Cell	Human	GST
	JAK2-81H	Active Recombinant Human JAK2, GST-tagged	Sf9 Insect Cell	Human	GST
	JAK2-116H	Active Recombinant Human JAK2(808-end) Protein, C-His-tagged	Sf21	Human	His
JAK3	JAK3-3174H	Recombinant Human JAK3 protein, His-tagged	E.coli	Human	His
	JAK3-252H	Recombinant Human JAK3 Protein, His-tagged	E.coli	Human	His
	Jak3-253M	Recombinant Mouse Jak3 Protein, His-tagged	E.coli	Mouse	His
	JAK3-117H	Active Recombinant Human JAK3(781-end) Protein, N-His-tagged	Sf21	Human	His
KRAS	KRAS-2569H	Recombinant Human KRAS, His-tagged	E.coli	Human	His
	KRAS-01H	Recombinant Human KRAS G12D mutant Protein, DYKDDDDK-tagged	Human cells	Human	DYKDDDDK

	KRAS-3965HAF488	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 488 conjugated	E.coli	Human	His
	KRAS-455HAF488	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 488 conjugated	E.coli	Human	His
	KRAS-456HAF488	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 488 conjugated	E.coli	Human	His
	KRAS-3965HAF555	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 555 conjugated	E.coli	Human	His
	KRAS-455HAF555	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 555 conjugated	E.coli	Human	His
	KRAS-456HAF555	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 555 conjugated	E.coli	Human	His
	KRAS-3965HAF647	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 647 conjugated	E.coli	Human	His
	KRAS-455HAF647	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 647 conjugated	E.coli	Human	His
	KRAS-456HAF647	Recombinant Human KRAS Protein, His-tagged, Alexa Fluor 647 conjugated	E.coli	Human	His
	KRAS-3965HF	Recombinant Human KRAS Protein, His-tagged, FITC conjugated	E.coli	Human	His
	KRAS-455HF	Recombinant Human KRAS Protein, His-tagged, FITC conjugated	E.coli	Human	His
	KRAS-456HF	Recombinant Human KRAS Protein, His-tagged, FITC conjugated	E.coli	Human	His
<u>MAPKAPK2</u>	MAPKAPK2-1792H	Recombinant Human MAPKAPK2 protein, GST-tagged	E.coli	Human	GST
	MAPKAPK2-1426H	Active Recombinant Human MAPKAPK2, His-tagged	Sf9 Insect Cell	Human	His
	MAPKAPK2-598H	Active Recombinant Human MAPKAPK2, GST-tagged	Sf9 Insect Cell	Human	GST
	MAPKAPK2-131H	Active Recombinant Human MAPKAPK2(46-end) Protein, N-GST-tagged	E.coli	Human	GST
	MAPKAPK2-132H	Inactive Recombinant Human MAPKAPK2(46-end) Protein, N-GST-tagged	E.coli	Human	GST
<u>NRAS</u>	NRAS-447H	Recombinant Human NRAS Protein, His-tagged	E.coli	Human	His
	NRAS-01H	Active Recombinant Human NRAS Protein, His-tagged	Bacterial expression system	Human	His
<u>PAK2</u>	PAK2-767H	Recombinant Human PAK2 Protein, His-tagged	E.coli	Human	His
	PAK2-179H	Active Recombinant Human PAK2(3-end) Protein, N-His and T7,C-His-tagged	E.coli	Human	His and T7,His

<u>PIK3CA</u>	PIK3CA-208B	Active Recombinant Bovine PIK3CA	Sf9 Insect Cell	Bovine	N/A
	PIK3CA&PIK3R1-150H	Active Recombinant Human PIK3CA(E545K)/PIK3R1 protein, His-tagged	Insect Cell	Human	His
	PIK3CA&PIK3R1-151H	Active Recombinant Human PIK3CA(N345K)/PIK3R1 protein, His-tagged	Insect Cell	Human	His
	PIK3CA&PIK3R1-152H	Active Recombinant Human PIK3CA(E542K)/PIK3R1 protein, His-tagged	Insect Cell	Human	His
	PIK3CA&PIK3R3-152H	Active Recombinant Human PIK3CA/PIK3R3 protein, His-tagged	Insect Cell	Human	His
	PIK3CA&PIK3R1-153H	Active Recombinant Human PIK3CA/PIK3R1 protein, GST-tagged	Insect Cell	Human	GST
	PIK3CA&PIK3R1-154H	Active Recombinant Human PIK3CA/PIK3R1 protein, His-tagged	Insect Cell	Human	His
	PIK3CA-1894H	Active Recombinant Human PI3 kinase (p110α/p85α) protein, GST-tagged	Insect Cell	Human	GST
	PIK3CA-2690HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-2941HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-8555HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-2229HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-9713HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-4827HF	Active Recombinant Full Length Human PIK3CA Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CA-7972HF	Active Recombinant Full Length Human PIK3CA Protein, GST-tagged	Insect (sf21)	Human	GST
<u>PIK3CB</u>	PIK3CB-3991H	Recombinant Human PIK3CB protein, His-tagged	E.coli	Human	His
<u>PIK3CD</u>	PIK3CD-1687HF	Active Recombinant Full Length Human PIK3CD Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
	PIK3CD-8212HF	Active Recombinant Full Length Human PIK3CD Protein, GST-tagged	Insect (sf21)	Human	GST
<u>PIK3CG</u>	PIK3CG-31759TH	Active Recombinant Human PIK3CG & PIK3R5 protein	Insect Cell	Human	N/A
	PIK3CG-158H	Active Recombinant Human PIK3CG protein, His-tagged	Insect Cell	Human	His

	PIK3CG-138HFL	Active Recombinant Full Length Human PIK3CG Protein, N-His-tagged	Sf21	Human	His
	PIK3CG-7361HF	Active Recombinant Full Length Human PIK3CG Protein, DDK-tagged, Biotinylated	Insect (sf21)	Human	DDK
PRKD1	PRKD1-155HFL	Active Recombinant Full Length Human PRKD1 Protein, N-His-tagged	Sf21	Human	His
	PRKD1-2864C	Recombinant Chicken PRKD1	Mammalian Cell	Chicken	His
	PRKD1-29764TH	Recombinant Human PRKD1		Human	N/A
PRKD2	PRKD2-1958H	Recombinant Human PRKD2, GST-tagged	E.coli	Human	GST
	PRKD2-763H	Recombinant Human PRKD2 protein(Met1-Leu878), His&GST-tagged	Insect Cells	Human	N-His&GST
	PRKD2-3588H	Recombinant Human PRKD2 protein, His-tagged	E.coli	Human	His
	PRKD2-204H	Active Recombinant Human PRKD2(G870E), GST-tagged	Sf9 Insect Cell	Human	GST
	PRKD2-151H	Active Recombinant Human PRKD2, GST-tagged	Sf9 Insect Cell	Human	GST
	PRKD2-156HFL	Active Recombinant Full Length Human PRKD2 Protein, N-His-tagged	Sf21	Human	His
PRKD3	PRKD3-960H	Recombinant Human PRKD3 protein(Met1-Pro890), GST-tagged	Insect Cells	Human	N-GST
	PRKD3-1959H	Recombinant Human PRKD3, GST-tagged	E.coli	Human	GST
PRKDC	PRKDC-3252H	Recombinant Human PRKDC protein, His-tagged	E.coli	Human	His
	PRKDC-64HFL	Active Recombinant Full Length Human PRKDC Protein, Flag-tagged	Mammalian cell line.	Human	Flag
	PRKDC-860H	Recombinant Human PRKDC Protein	HeLa	Human	N/A
RAC1	RAC1-2147H	Recombinant Human RAC1, His-tagged	E.coli	Human	His
	RAC1-2213H	Recombinant Human RAC1 protein, GST-tagged	Insect Cells	Human	GST
	RAC1-192H	Active Recombinant Human RAC1, GST-tagged	E.coli	Human	GST
	RAC1-190H	Active Recombinant Human RAC1, His-tagged	E.coli	Human	His
RAP1A	RAP1A-2176H	Recombinant Human RAP1A, His-tagged	E.coli	Human	His
	Rap1a-255R	Recombinant Rat Rap1a	E.coli	Rat	N/A
	RAP1A-4923R	Recombinant Rat RAP1A Protein	Mammalian Cell	Rat	His
RAP1B	RAP1B-2177H	Recombinant Human RAP1B, GST-tagged	E.coli	Human	GST
	RAP1B-2828H	Recombinant Human RAP1B protein, His-tagged	E.coli	Human	His
SHC1	SHC1-2654H	Recombinant Human SHC1, GST-tagged	E.coli	Human	GST
	SHC1-3579H	Recombinant Human SHC1, His-tagged	E.coli	Human	His

	SHC1-30065TH	Recombinant Human SHC1, His-tagged	E.coli	Human	His
SHC2	SHC2-4062Z	Recombinant Zebrafish SHC2	Mammalian Cell	Zebrafish	His
	SHC2-15091M	Recombinant Mouse SHC2 Protein	Mammalian Cell	Mouse	His
	SHC2-5390R	Recombinant Rat SHC2 Protein	Mammalian Cell	Rat	His
	Shc2-1745M	Recombinant Mouse Shc2 protein, His & T7-tagged	E.coli	Mouse	His/T7
SPHK1	SPHK1-2915H	Recombinant Human SPHK1, GST-tagged	E.coli	Human	GST
	SPHK1-1483H	Active Recombinant Human SPHK1, GST-tagged	Sf9 Insect Cell	Human	GST
	SPHK1-741H	Active Recombinant Human SPHK1 Protein, Met & His-tagged	Sf21 Insect Cell	Human	Met/His
	Sphk1-526M	Active Recombinant Mouse Sphk1 protein, Met/His-tagged	Insect Cell	Mouse	Met/His
	SPHK1-174H	Active Recombinant Human SPHK1 protein, GST-tagged	Insect Cell	Human	GST
	SPHK1-1331H	Active Recombinant Human SPHK1 protein(Met1-Leu384)	Insect Cells	Human	N/A
SPHK2	SPHK2-175H	Active Recombinant Human SPHK2 protein, GST-tagged	Insect Cell	Human	GST
	SPHK2-1300H	Recombinant Human SPHK2 protein, His & T7-tagged	E.coli	Human	His/T7
	SPHK2-30668TH	Recombinant Human SPHK2, His-tagged		Human	His
SRC	SRC-2947H	Recombinant Human SRC, GST-tagged	E.coli	Human	GST
	SRC-22H	Recombinant Human SRC protein, His-tagged	E.coli	Human	His
	SRC-533H	Active Recombinant Human SRC protein, His-tagged	Insect Cell	Human	His
	SRC-575H	Active Recombinant Human SRC, GST-tagged	E.coli	Human	GST
	SRC-1100H	Active Recombinant Human SRC protein, GST-tagged	E.coli	Human	GST
	SRC-1358H	Active Recombinant Human SRC protein, His/GST-tagged	Insect Cell	Human	His/GST
	Src-546R	Active Recombinant RSV Src, GST-tagged	Sf9 Insect Cell	RSV	GST
	SRC-170HFL	Active Recombinant Full Length Human SRC(T341M) Mutation Protein, N-His-tagged	Sf21	Human	His

	SRC-171HFL	Active Recombinant Full Length Human SRC Protein, N-His-tagged	Sf21	Human	His
	SRC-231H	Active Recombinant Human SRC(1-530) Protein, N-His-tagged	Sf21	Human	His
<u>STAT3</u>	STAT3-29823TH	Active Recombinant Full Length Human STAT3, His-tagged	E.coli	Human	His
	STAT3-1496H	Recombinant Human STAT3, GST-tagged	Sf9 Insect Cell	Human	GST
	STAT3-39228H	Recombinant Human STAT3, GST-tagged	E.coli	Human	GST
<u>VAV2</u>	VAV2-3653H	Recombinant Human VAV2, GST-tagged	E.coli	Human	GST
	VAV2-17990M	Recombinant Mouse VAV2 Protein	Mammalian Cell	Mouse	His
	VAV2-5148R	Recombinant Rhesus monkey VAV2 Protein, His-tagged	Mammalian Cell	Rhesus Macaque	His
<u>VEGFA</u>	VEGFA-362H	Active Recombinant Human VEGFA protein	HEK293	Human	N/A
	VEGFA-365H	Recombinant Human Vascular Endothelial Growth Factor 165	P.pastoris	Human	N/A
	VEGFA-210H	Active Recombinant Human VEGFA	Insect Cell	Human	N/A
	Vegfa-475M	Active Recombinant Mouse Vegfa protein(Met1-Arg190)	Insect Cells	Mouse	N/A
	VEGFA-210HAF647	Active Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 647 conjugated	Insect Cell	Human	N/A
	Vegfa-38R	Active Recombinant Rat Vegfa protein, His-tagged, 27-190aa	HEK293	Human	His
	VEGFA-548H	Recombinant Human VEGFA, None tagged	Insect Cell	Human	N/A
	VEGFA-17H	Recombinant Human VEGFA protein	E.coli	Human	N/A
	Vegfa-18M	Recombinant Mouse Vegfa protein	P.pastoris	Mouse	N/A
	VEGFA-4326G	Recombinant Goat VEGFA Protein	Yeast	Goat	N/A
	VEGFA-4373C	Recombinant Chicken VEGFA Protein	Yeast	Chicken	N/A
	VEGFA-274H	Active Recombinant Human VEGFA Protein, His-Avi-tagged, Biotinylated	HEK293	Human	His/Avi
	VEGFA-210HAF488	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 488 conjugated	Insect Cells	Human	no tag
	VEGFA-302CAF488	Recombinant Canine VEGFA Protein, None-tagged, Alexa Fluor 488 conjugated	HEK293	Dog	N/A
	VEGFA-309HAF488	Recombinant Human VEGFA Protein, Alexa Fluor 488 conjugated	HEK293	Human	6 amino acids
	VEGFA-406HAF488	Recombinant Human VEGFA Prorein, Alexa Fluor 488 conjugated	HEK293	Human	

Vegfa-475MAF488	Recombinant Mouse Vegfa Protein, None-tagged, Alexa Fluor 488 conjugated	Insect Cells	Mouse	no tag
VEGFA-548HAF488	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 488 conjugated	Insect Cells	Human	no tag
VEGFA-549HAF488	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 488 conjugated	Insect Cells	Human	no tag
VEGFA-7310HAF488	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 488 conjugated	HEK293	Human	no tag
Vegfa-878RAF488	Recombinant Rat Vegfa Protein, None-tagged, Alexa Fluor 488 conjugated	Insect Cells	Rat	no tag
VEGFA-210HAF555	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 555 conjugated	Insect Cells	Human	no tag
VEGFA-302CAF555	Recombinant Canine VEGFA Protein, None-tagged, Alexa Fluor 555 conjugated	HEK293	Dog	N/A
VEGFA-309HAF555	Recombinant Human VEGFA Protein, Alexa Fluor 555 conjugated	HEK293	Human	6 amino acids
VEGFA-406HAF555	Recombinant Human VEGFA Protein, Alexa Fluor 555 conjugated	HEK293	Human	
Vegfa-475MAF555	Recombinant Mouse Vegfa Protein, None-tagged, Alexa Fluor 555 conjugated	Insect Cells	Mouse	no tag
VEGFA-548HAF555	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 555 conjugated	Insect Cells	Human	no tag
VEGFA-549HAF555	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 555 conjugated	Insect Cells	Human	no tag
VEGFA-7310HAF555	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 555 conjugated	HEK293	Human	no tag
Vegfa-878RAF555	Recombinant Rat Vegfa Protein, None-tagged, Alexa Fluor 555 conjugated	Insect Cells	Rat	no tag
VEGFA-302CAF647	Recombinant Canine VEGFA Protein, None-tagged, Alexa Fluor 647 conjugated	HEK293	Dog	N/A
VEGFA-309HAF647	Recombinant Human VEGFA Protein, Alexa Fluor 647 conjugated	HEK293	Human	6 amino acids
VEGFA-406HAF647	Recombinant Human VEGFA Protein, Alexa Fluor 647 conjugated	HEK293	Human	
Vegfa-475MAF647	Recombinant Mouse Vegfa Protein, None-tagged, Alexa Fluor 647 conjugated	Insect Cells	Mouse	no tag
VEGFA-548HAF647	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 647 conjugated	Insect Cells	Human	no tag
VEGFA-549HAF647	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 647 conjugated	Insect Cells	Human	no tag

VEGFA-7310HAF647	Recombinant Human VEGFA Protein, None-tagged, Alexa Fluor 647 conjugated	HEK293	Human	no tag
Vegfa-878RAF647	Recombinant Rat Vegfa Protein, None-tagged, Alexa Fluor 647 conjugated	Insect Cells	Rat	no tag
VEGFA-210HF	Recombinant Human VEGFA Protein, None-tagged, FITC conjugated	Insect Cells	Human	no tag
VEGFA-302CF	Recombinant Canine VEGFA Protein, None-tagged, FITC conjugated	HEK293	Dog	N/A
VEGFA-309HF	Recombinant Human VEGFA Protein, FITC conjugated	HEK293	Human	6 amino acids
VEGFA-406HF	Recombinant Human VEGFA Protein, FITC conjugated	HEK293	Human	
Vegfa-475MF	Recombinant Mouse Vegfa Protein, None-tagged, FITC conjugated	Insect Cells	Mouse	no tag
VEGFA-548HF	Recombinant Human VEGFA Protein, None-tagged, FITC conjugated	Insect Cells	Human	no tag
VEGFA-549HF	Recombinant Human VEGFA Protein, None-tagged, FITC conjugated	Insect Cells	Human	no tag
VEGFA-7310HF	Recombinant Human VEGFA Protein, None-tagged, FITC conjugated	HEK293	Human	no tag
Vegfa-878RF	Recombinant Rat Vegfa Protein, None-tagged, FITC conjugated	Insect Cells	Rat	no tag
Vegfa-36M	Active Recombinant Mouse Vegfa, His-tagged	Barley Grain	Mouse	His
VEGFA-273H	Active Recombinant Human VEGFA Protein, His & Avi-tagged, Biotinylated	HEK293	Human	His/Avi
Vegfa-729M	Active Recombinant Mouse Vegfa Protein, His & Avi-tagged, Biotinylated	HEK293	Mouse	His/Avi
VEGFA-172H	Active Recombinant Human VEGFA Protein, Biotinylated	Insect Cell	Human	N/A
Vegfa-586R	Active Recombinant Rat Vascular Endothelial Growth Factor-165	E.coli	Rat	N/A
Vegfa-27R	Active Recombinant rat VEGF 164	Mammalian cells	Rat	N/A
Vegfa-9928R	Active Recombinant Rat Vegfa	CHO	Rat	N/A
Vegfa-762R	Active Recombinant Rat Vegfa	P.pastoris	Rat	N/A
Vegfa-383R	Active Recombinant Rat Vegfa	Mammalian cells	Rat	N/A
Vegfa-725M	Active Recombinant Mouse Vegfa, Isoform 120, His-tagged, Biotinylated	Human Cell	Mouse	His

Vegfa-726M	Active Recombinant Mouse Vegfa, Isoform 120, His-tagged	Human Cell	Mouse	His
Vegfa-727M	Active Recombinant Mouse Vegfa, Isoform 164, His-tagged, Biotinylated	Human Cell	Mouse	His
Vegfa-728M	Active Recombinant Mouse Vegfa, Isoform 164, His-tagged	Human Cell	Mouse	His
VEGFA-19H	Active Recombinant Human VEGFA protein	E.coli	Human	N/A
VEGFA -24D	Active Recombinant Canine VEGF	E.coli	Canine	N/A
VEGFA-270C	Active Recombinant Canine VEGFA	E.coli	Canine	N/A
VEGFA-583H	Active Recombinant Human Vascular Endothelial Growth Factor A	E.coli	Human	N/A
VEGFA-711H	Active Recombinant Human VEGFA, Isoform 165, His-tagged, Biotinylated	Human Cell	Human	His
VEGFA-25H	Active Recombinant Human VEGF 162	Mammalian cells	Human	N/A
VEGFA-156H	Active Recombinant Human VEGF165	HEK293	Human	N/A
VEGFA-543H	Active Recombinant Human VEGFA	Human	Human	His
VEGFA-8699H	Active Recombinant Human VEGFA	P.pastoris	Human	N/A
VEGFA-521H	Active Recombinant Human VEGFA	HEK293	Human	N/A
VEGFA-637F	Active Recombinant Feline VEGFA, Met-tagged	E.coli	Feline	Met
VEGFA-549H	Active Recombinant Human VEGFA protein	Insect Cell	Human	N/A
Vegfa-26M	Active Recombinant mouse VEGF 164	Sf21 Insect Cell	Mouse	N/A
Vegfa-530M	Active Recombinant Mouse Vegfa	Sf9 Insect Cell	Mouse	N/A
Vegfa-172M	Active Recombinant Mouse Vegfa	Sf21 Insect Cell	Mouse	N/A
Vegfa-206M	Active Recombinant Mouse Vegfa	E.coli	Mouse	N/A
VEGFA-648H	Active Recombinant Human VEGFA	E.coli	Human	N/A
VEGFA-703H	Active Recombinant Human VEGFA	Sf21 Insect Cell	Human	N/A
VEGFA-504H	Active Recombinant Human VEGFA	CHO	Human	N/A
VEGFA-272H	Active Recombinant Human VEGFA, Biotinylated	HEK293	Human	N/A
VEGFA-101H	Active Recombinant Human VEGFA, His-tagged	Barley Grain	Human	His
VEGFA-425H	Active Recombinant Human VEGFA, Met-tagged	E.coli	Human	Met
VEGFA-649H	Active Recombinant Human VEGFA, Met-tagged	E.coli	Human	Met
VEGFA-710H	Active Recombinant Human VEGFA, Met-tagged	E.coli	Human	Met

	VEGFA-159H	Active Recombinant Human VEGFA protein (Met1-Arg136)	HEK293	Human	
	VEGFA-136C	Active Recombinant Human/Cynomolgus VEGF165 protein (Met1-Arg191)	HEK293	Human, Cynomolgus	
	VEGFA-051H	Active Recombinant Human VEGFA protein, Avi-tagged, Biotinylated	HEK293 cells	Human	Avi
	VEGFA-100H	Active Recombinant Human VEGFA Protein	Rice Grain	Human	N/A
	VEGFA-01HG	Active GMP Recombinant Human VEGFA Protein	CHO-K1	Human	
	Vegfa-01M	Active GMP Recombinant Mouse Vegfa 121 Protein, His-Tagged	E.coli	Mouse	His
	Vegfa-02M	Active GMP Recombinant Mouse Vegfa 165 Protein, His-Tagged	E.coli	Mouse	His
	Vegfa-2102M	Active Recombinant Mouse Vegfa protein	HEK293	Mouse	N/A
	Vegfa-2103M	Active Recombinant Mouse Vegfa protein	HEK293	Mouse	N/A
	Vegfa-2104H	Active Recombinant Human Vegfa protein(Met1-Asp147)	HEK293	Human	N/A
<u>YES1</u>	YES1-3765H	Recombinant Human YES1, His-tagged	E.coli	Human	His
	YES1-1509H	Active Recombinant Human YES1, GST-tagged	Sf9 Insect Cell	Human	GST
	YES1-185HFL	Active Recombinant Full Length Human YES1 Protein, N-His-tagged	Sf21	Human	His