



Recombinant Protein *Catalog*

About KACTUS

KACTUS excels in crafting and producing an array of superior-grade, highly active recombinant proteins and enzymes, catering to diverse sectors like antibody drug discovery, immunotherapy, gene therapy, and mRNA therapeutics. Our expansive catalog, boasting over 3000 recombinant proteins, encompasses a wide spectrum of targets, species, tags, and labels, each thoughtfully chosen to address the specific, unmet needs of scientists engaged in drug development. The hallmark of our product selection process is a rigorous emphasis on exceptional quality and a steadfast commitment to ensuring reliable supply, thereby upholding the highest standards of excellence and client satisfaction.

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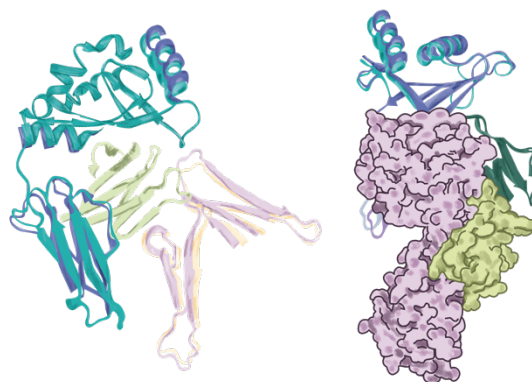
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Our Mission

Delivering first-to-market recombinant proteins and enzymes with a commitment to quality, speed, and reliability.

KACTUS excels in crafting and producing an array of superior-grade, highly active recombinant proteins and enzymes, catering to diverse sectors like antibody drug discovery, immunotherapy, gene therapy, and mRNA therapeutics. Our expansive catalog, boasting over 3000 recombinant proteins, encompasses a wide spectrum of targets, species, tags, and labels, each thoughtfully chosen to address the specific, unmet needs of scientists engaged in drug development. The hallmark of our product selection process is a rigorous emphasis on exceptional quality and a steadfast commitment to ensuring prompt and reliable supply, thereby upholding the highest standards of excellence and client satisfaction.



Why choose KACTUS?

→ A highly curated catalog based on three important factors:

1. Addressing unmet consumer needs. Our catalog products have been carefully chosen based on the current requirements of scientists. This includes fulfilling overlooked research needs and emerging demands. To keep pace with the ever-evolving scientific landscape, our catalog dynamically adapts, which is why we introduce new, innovative products every month.
2. Product Quality. We pride ourselves on our commitment to protein quality. Our products undergo rigorous analysis for purity, bioactivity, endotoxin, etc., using reliable analytical methods, including SEC-HPLC, PAGE, SPR, ELISA, cell-based assays, and LAL. Only products meeting our stringent quality standards are selected for inclusion in our catalog.
3. Reliability of Supply. With over 15,000 square meters of state-of-the-art manufacturing facilities, we ensure a dependable and continuous supply of products from our catalog, including bulk quantities as needed, to meet our clients' demands consistently and efficiently.

→ Fast customer service and order fulfillment.

- Products ship from our strategically located inventory hub in Boston, MA
- Most products offer same-day or next-day order fulfillment with overnight shipping to the US
- Worldwide shipping with 2-4 day delivery to most global destinations
- Comprehensive selection of global distributors for simpler global order fulfillment
- Personalized customer responses within one business day, but typically sooner

→ History of Excellence

- First company to express full-length Claudin 18.2 in July 2018
- Establishment of GMP enterprise in 2020
- 9 FDA Drug Master File submissions in 2021
- GMP-Grade Enzyme approved for clinical trial in December 2022

Today, KACTUS operates on a global frontier with expanded product accessibility worldwide.

Our Commitment to Sustainability

- 100% recyclable packaging for most products
- Minimized use of styrofoam when possible
- Strategic packaging design to avoid use of excess material
- Maintenance of product integrity and safety

Our Values

Quality.

Our ambition is to be recognized as a premier global biotechnology leader, relentlessly committed to serving the evolving needs of the biopharmaceutical and diagnostic industries worldwide with products that meet our high standards for innovation and performance.

Innovation.

Our company's ethos is rooted in innovation and ambition. We harness creativity and state-of-the-art technology to pioneer new directions within our industry. With a forward-thinking approach, we constantly venture into new territories, crafting revolutionary products and solutions that go beyond meeting current demands to foresee and fulfill the future needs of our customers. Resilient in the face of challenges, we are not deterred by technological setbacks; instead, we seize them as opportunities to lead with unique design concepts and strive to introduce first-to-market products that set industry standards.

Service.

Our dedication to exceptional service forms the cornerstone of our business ethos. We believe in building lasting relationships with our clients, grounded in trust and reliability. By offering personalized, responsive, and comprehensive support, we ensure that every interaction adds value and exceeds expectations, reinforcing our commitment to not just meeting, but enhancing the customer experience.

Our Commitment to Quality.

Delivering pure, active, and consistent proteins.

Quality control is a critical aspect of recombinant protein production that ensures the purity, potency, and consistency of the final product. Our quality control systems are designed to monitor and assess the quality of the production process and the final product.

Key Features of Product Quality Control:

- Various expression systems based on protein properties
- Bis-Tris Page/SEC-HPLC analysis for identity and purity
- SPR/ELISA/cell-based assays for activity
- Endotoxin Testing

Complete Vertical Integration from Protein Engineering to Expression.

All aspects of our protein production process for every product are meticulously carried out in-house. By not outsourcing any step, we maintain the highest standards of quality and precision for every product.

1. Structural optimization
2. Expression optimization
3. Large-scale manufacturing
4. Analytical characterization and quality release testing

Process Validation

We monitor the entire process to ensure expression conditions are optimal for that specific protein, including host cell growth, target gene expression, and protein purification. The process is optimized to maximize the purity and maintain the high activity of the final product with maximal yield so we can offer quality products at an affordable price.

Analytical Testing

- *Purity.* The purity of our products is verified using HPLC and/or Bis-Tris PAGE and endotoxin analysis to quantify the level of impurities in the final product.
- *Activity.* The potency of our recombinant proteins is analyzed by measuring their in vitro activity, such as their ability to bind to their target molecule via ELISA or SPR assay.
- *Consistency.* Our products are tested for batch-to-batch consistency to ensure stable bioactivity and purity across lots. Additionally, we assess the stability of our products by measuring degradation over time and resistance to environmental stress factors, such as temperature, freeze-thaw cycle, light exposure pH changes.

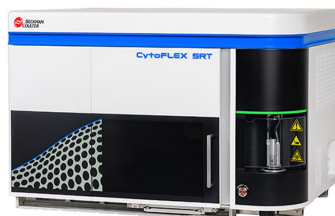
In-House Analytical Equipment

We are equipped with the most up-to-date modern analytical machines and all equipment are qualified for QC release testing.

Biacore T200



CytoFlex SRT Flow Sorter



1260 High-Performance Liquid Chromatography



6545XT Q-TOF Mass Spectrometer



Microplate Reader



Capillary Electrophoresis



ISO13485 Accreditation

ISO13485:2016 certification is an internationally recognized standard that sets out the requirements for a quality management system that ensures companies adhere to stringent quality control measures, regulatory compliance, and risk management practices throughout the entire product lifecycle. Our company has obtained ISO13485:2016 certification to demonstrate our commitment to producing safe, reliable, and high-quality proteins and enzymes.

Approval ID: 00034327

MHC & TCR Products

High-quality MHC catalog products with next-day shipping from Boston, MA.

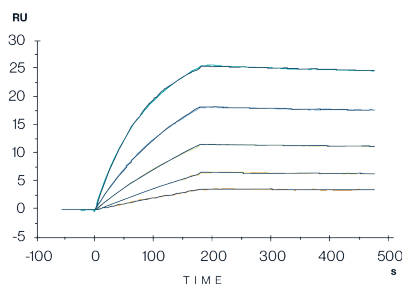
MHC Monomers & Tetramers

To facilitate MHC-related research, KACTUS employs its SAMSTTM protein engineering platform and HEK293 mammalian expression systems. This platform circumvents the challenges of prokaryotic refolding processes, ensuring the natural conformation and high biological activity of MHC monomers and tetramers. We offer an array of MHC monomers and tetramers with various fluorescent labels and biotinylation, including targets such as NY-ESO-1, WT-1, GP100, and MAGE-A3/A4, among others. Additionally, we provide customized MHC-peptide complex development services to meet specific research needs, leveraging our technology platforms for high bioactivity and batch consistency.

Product Features

- Monomers and tetramers in various alleles
- Fluorescent labeling of monomers and tetramers including APC-equivalent, PE-labeling, and FITC-labeling
- Biotinylated MHC monomers
- Mammalian HEK293 expression systems ensure natural folding and configuration including disulfide bonds
- Verified bioactivity via ELISA & SPR to ensure binding with TCRs
- > 95% Purity by HPLC & Bis-Tris Page for quality results
- Customized MHC-peptide complex expression services

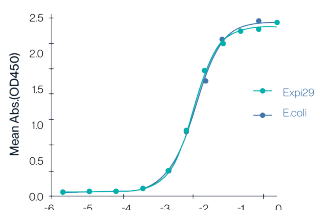
Performance Validation



MHC tetramers offer high binding affinity to TCRs verified via SPR.

Our Peptide-MHCs demonstrate high binding affinity to neoantigen antibodies. Here we demonstrate Anti-NY-ESO-1 (HLA-A*02:01) Antibody, hFc Tag captured on CM5 Chip via Protein A binds Human NY-ESO-1 (HLA-A*02:01) Tetramer, His Tag with an affinity constant of 0.09 nM as determined via SPR assay (Biacore T200).

Human NY-ESO1 (HLA-A*02:01) Tetramer, His Tag ELISA
0.5µg Human NY-ESO-1 (HLA-A*02:01) Tetramer, His Tag Per Well



Log Anti-NY-ESO-1 (HLA-A*02:01) Antibody, hFc Tag Conc. (µg/ml)

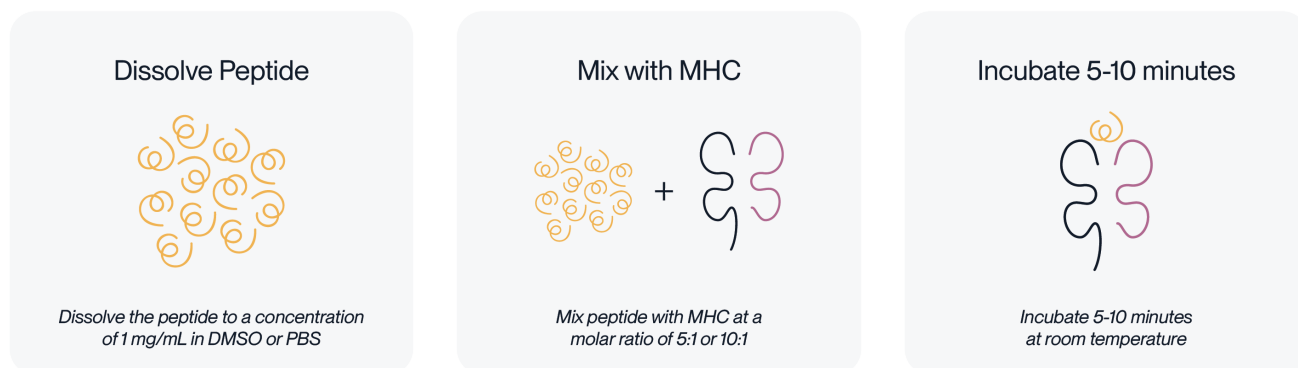
HEK293 expression systems offer equivalent bioactivity

performance to E. coli. KACTUS Peptide-MHCs demonstrate both quality and versatility. As verified by ELISA, the activity of NY-ESO-1 (HLA-A*02:01) tetramer is comparable with both mammalian and E. coli expression.

Peptide-ready MHCs: Quickly load your MHC monomer or tetramer with a custom peptide in-house.

Our specialized portfolio also includes peptide-ready MHCs (prMHCs), specifically designed for customizable MHC-peptide complex generation in immunological research. prMHCs are peptide-free MHC monomers & tetramers stabilized using our proprietary protein engineering techniques. They can be quickly and easily loaded with peptides to create custom MHC peptide tetramers and facilitate high-throughput peptide screening.

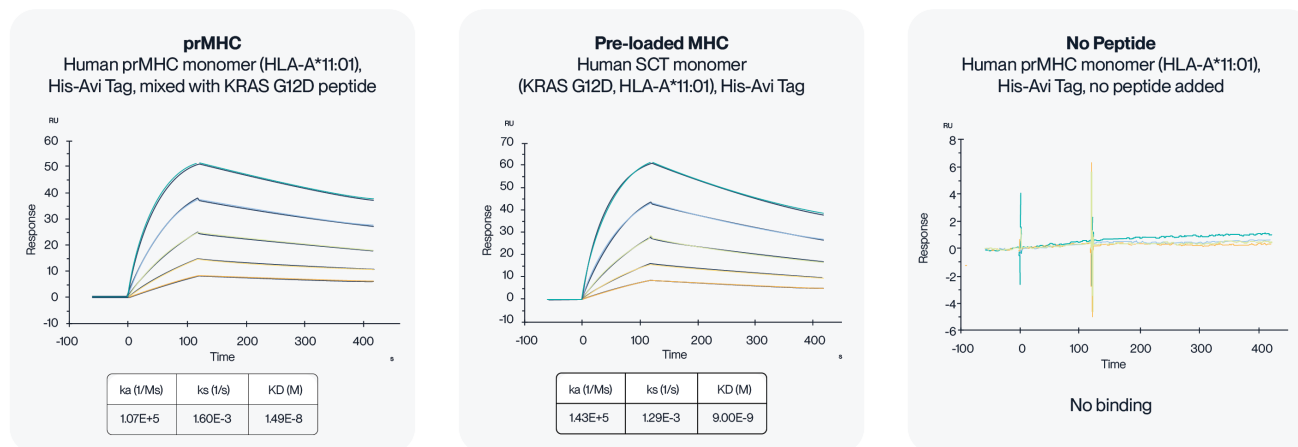
Quick and simple loading protocol



High purity & mammalian HEK293 expression

Expressed from HEK293 cells, our prMHCs have natural folding and maintain a purity level exceeding 95%, ensuring high-quality results in your experiments.

Performance Validation



SPR analysis demonstrates comparable bioactivity between peptide-loaded prMHCs and pre-loaded MHCs. SPR characterization of KRAS-G12D specific TCR (JD1a41b1) binding with peptide (VVVGADGVGK) loaded onto prMHC HLA-A*11:01 compared to pre-loaded pMHC (KRAS-G12D, HLA-A*11:01).

Peptide-ready MHCs Product List:

Catalog #	Allele	Form	Species	Tag
MHC-HM43R	HLA-A*02:01	Monomer	Human	C-His-Avi
MHC-HM43RB	HLA-A*02:01	Biotinylated Monomer	Human	C-His-Avi
MHC-HM43RTC	HLA-A*02:01	APC-Equivalent Tetramer	Human	C-His-Avi
MHC-HM43RTP	HLA-A*02:01	PE-Labeled Tetramer	Human	C-His-Avi
MHC-HM44R	HLA-A*03:01	Monomer	Human	C-His-Avi
MHC-HM44RB	HLA-A*03:01	Biotinylated Monomer	Human	C-His-Avi
MHC-HM44RTP	HLA-A*03:01	PE-Labeled Tetramer	Human	C-His-Avi
MHC-HM41R	HLA-A*11:01	Monomer	Human	C-His-Avi
MHC-HM41RB	HLA-A*11:01	Biotinylated Monomer	Human	C-His-Avi
MHC-HM41RTP	HLA-A*11:01	PE-Labeled Tetramer	Human	C-His-Avi
MHC-HM46R	HLA-A*24:02	Monomer	Human	C-His-Avi
MHC-HM46RB	HLA-A*24:02	Biotinylated Monomer	Human	C-His-Avi
MHC-HM47R	HLA-B*07:02	Monomer	Human	C-His-Avi
MHC-HM42R	HLA-E*01:03	Monomer	Human	C-His-Avi
MHC-HM42RB	HLA-E*01:03	Biotinylated Monomer	Human	C-His-Avi
MHC-HM45R	HLA-G	Monomer	Human	C-His-Avi
MHC-HM45RB	HLA-G	Biotinylated Monomer	Human	C-His-Avi

MHC Monomer & Tetramer Product List:

Catalog #	Allele	Form	Antigen	Peptide	Species	Tag
HLA-A*01:01						
MHC-HM427	HLA-A*01:01	Monomer	MAGE-A3	EVDPIGHLY	Human	C-His-Avi
MHC-HM427T	HLA-A*01:01	Tetramer	MAGE-A3	EVDPIGHLY	Human	C-His-Avi
MHC-HM426	HLA-A*01:01	Monomer	CT83	NTDNNLAVY	Human	C-His-Avi
MHC-HM426T	HLA-A*01:01	Tetramer	CT83	NTDNNLAVY	Human	C-His-Avi
MHC-HM428	HLA-A*01:01	Monomer	DSG3	YTDNWLAVY	Human	C-His-Avi
HLA-A*02:01						
MHC-HM447	HLA-A*02:01	Monomer	PRAME	ALYVDSLFFL	Human	C-His-Avi
MHC-HM411	HLA-A*02:01	Monomer	LMP2	CLGGLLTMV	Human	C-His-Avi
MHC-HM411B	HLA-A*02:01	Biotinylated Monomer	LMP2	CLGGLLTMV	Human	C-His-Avi
MHC-HM411T	HLA-A*02:01	Tetramer	LMP2	CLGGLLTMV	Human	C-His-Avi
MHC-HM413	HLA-A*02:01	Monomer	LMP2	CLGGLLTMV	Human&Mouse	C-His-Avi
MHC-HM413T	HLA-A*02:01	Tetramer	LMP2	CLGGLLTMV	Human&Mouse	C-His-Avi
MHC-HM435	HLA-A*02:01	Monomer	MART-1	ELAGIGILTV	Human	C-His-Avi
MHC-HM435T	HLA-A*02:01	Tetramer	MART-1	ELAGIGILTV	Human	C-His-Avi
MHC-HM409	HLA-A*02:01	Monomer	HBV	FLLTRILT	Human	C-His-Avi
MHC-HM409B	HLA-A*02:01	Biotinylated Monomer	HBV	FLLTRILT	Human	C-His-Avi
MHC-HM409T	HLA-A*02:01	Tetramer	HBV	FLLTRILT	Human	C-His-Avi
MHC-HM407B	HLA-A*02:01	Biotinylated Monomer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM407	HLA-A*02:01	Monomer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM407T	HLA-A*02:01	Tetramer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM407TP	HLA-A*02:01	PE-Labeled Tetramer	AFP	FMNKFIYEI	Human	C-His-Avi

Catalog #	Allele	Form	Antigen	Peptide	Species	Tag
MHC-HM459	HLA-A*02:01	Monomer	MAGE-A10	GLYDGMEHL	Human	C-His-Avi
MHC-HM459B	HLA-A*02:01	Biotinylated Monomer	MAGE-A10	GLYDGMEHL	Human	C-His-Avi
MHC-HM459T	HLA-A*02:01	Tetramer	MAGE-A10	GLYDGMEHL	Human	C-His-Avi
MHC-HM459TP	HLA-A*02:01	PE-Labeled Tetramer	MAGE-A10	GLYDGMEHL	Human	C-His-Avi
MHC-HM401	HLA-A*02:01	Monomer	MAGE-A4	GVYDGREHTV	Human	C-His-Avi
MHC-HM401B	HLA-A*02:01	Biotinylated Monomer	MAGE-A4	GVYDGREHTV	Human	C-His-Avi
MHC-HM401T	HLA-A*02:01	Tetramer	MAGE-A4	GVYDGREHTV	Human	C-His-Avi
MHC-HM401TP	HLA-A*02:01	PE-Labeled Tetramer	MAGE-A4	GVYDGREHTV	Human	C-His-Avi
MHC-HM415	HLA-A*02:01	Monomer	P53 R175H	HMTEVVRHC	Human	C-His-Avi
MHC-HM415B	HLA-A*02:01	Biotinylated Monomer	P53 R175H	HMTEVVRHC	Human	C-His-Avi
MHC-HM415T	HLA-A*02:01	Tetramer	P53 R175H	HMTEVVRHC	Human	C-His-Avi
MHC-HM415TP	HLA-A*02:01	PE-Labeled Tetramer	P53 R175H	HMTEVVRHC	Human	C-His-Avi
MHC-HM416	HLA-A*02:01	Monomer	P53 WT	HMTEVVRRC	Human	C-His-Avi
MHC-HM416B	HLA-A*02:01	Biotinylated Monomer	P53 WT	HMTEVVRRC	Human	C-His-Avi
MHC-HM416T	HLA-A*02:01	Tetramer	P53 WT	HMTEVVRRC	Human	C-His-Avi
MHC-HM416TP	HLA-A*02:01	PE-Labeled Tetramer	P53 WT	HMTEVVRRC	Human	C-His-Avi
MHC-HM436	HLA-A*02:01	Monomer	HPV 16 E6	KLPQLCTEL	Human	C-His-Avi
MHC-HM436T	HLA-A*02:01	Tetramer	HPV 16 E6	KLPQLCTEL	Human	C-His-Avi
MHC-HE008B	HLA-A*02:01	Biotinylated Monomer	KRAS WT	KLVVVGAGGV	Human	C-His-Avi
MHC-HE007B	HLA-A*02:01	Biotinylated Monomer	KRAS G12V	KLVVVGAVGV	Human	C-His-Avi
MHC-HM460B	HLA-A*02:01	Biotinylated Monomer	MAGE-A2	KMVELVHFL	Human	C-His-Avi
MHC-HM461B	HLA-A*02:01	Biotinylated Monomer	MAGE-A3	KVAELVHFL	Human	C-His-Avi
MHC-HM437	HLA-A*02:01	Monomer	MAGE-A4 or MAGE-A8	KVLEHVVRV	Human	C-His-Avi
MHC-HM437B	HLA-A*02:01	Biotinylated Monomer	MAGE-A4 or MAGE-A8	KVLEHVVRV	Human	C-His-Avi
MHC-HM445	HLA-A*02:01	Monomer	MAGE-A1	KVLEYVIKV	Human	C-His-Avi
MHC-HM445B	HLA-A*02:01	Biotinylated Monomer	MAGE-A1	KVLEYVIKV	Human	C-His-Avi
MHC-HM445T	HLA-A*02:01	Tetramer	MAGE-A1	KVLEYVIKV	Human	C-His-Avi
MHC-HM445TP	HLA-A*02:01	PE-Labeled Tetramer	MAGE-A1	KVLEYVIKV	Human	C-His-Avi
MHC-HM412	HLA-A*02:01	Monomer	Survivin	LMLGEFLKL	Human	C-His-Avi
MHC-HM412B	HLA-A*02:01	Biotinylated Monomer	Survivin	LMLGEFLKL	Human	C-His-Avi
MHC-HM412T	HLA-A*02:01	Tetramer	Survivin	LMLGEFLKL	Human	C-His-Avi
MHC-HM458	HLA-A*02:01	Monomer	CMV pp65	NLVPMVATV	Human	C-His-Avi
MHC-HM458B	HLA-A*02:01	Biotinylated Monomer	CMV pp65	NLVPMVATV	Human	C-His-Avi
MHC-HM458T	HLA-A*02:01	Tetramer	CMV pp65	NLVPMVATV	Human	C-His-Avi
MHC-HM408	HLA-A*02:01	Monomer	AFP	PLFQVPEPV	Human	C-His-Avi
MHC-HM408B	HLA-A*02:01	Biotinylated Monomer	AFP	PLFQVPEPV	Human	C-His-Avi
MHC-HM408T	HLA-A*02:01	Tetramer	AFP	PLFQVPEPV	Human	C-His-Avi
MHC-HM414	HLA-A*02:01	Monomer	WT-1	RMFPNAPYL	Human&Mouse	C-His-Avi
MHC-HM414T	HLA-A*02:01	Tetramer	WT-1	RMFPNAPYL	Human&Mouse	C-His-Avi
MHC-HM431	HLA-A*02:01	Monomer	WT-1	RMFPNAPYL	Human	C-His-Avi
MHC-HM431B	HLA-A*02:01	Biotinylated Monomer	WT-1	RMFPNAPYL	Human	C-His-Avi
MHC-HM431T	HLA-A*02:01	Tetramer	WT-1	RMFPNAPYL	Human	C-His-Avi

Catalog #	Allele	Form	Antigen	Peptide	Species	Tag
MHC-HM425T	HLA-A*02:01	Tetramer	WT-1	RMFPNAPYL	Human&Mouse	C-His-Avi
MHC-HE446	HLA-A*02:01	Monomer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HE446T	HLA-A*02:01	Tetramer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM405	HLA-A*02:01	Monomer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM405B	HLA-A*02:01	Biotinylated Monomer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM405T	HLA-A*02:01	Tetramer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM405TP	HLA-A*02:01	PE-Labeled Tetramer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM424T	HLA-A*02:01	Tetramer	NY-ESO-1	SLLMWITQC	Human&Mouse	C-His-Avi
MHC-HM446	HLA-A*02:01	Monomer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM446T	HLA-A*02:01	Tetramer	NY-ESO-1	SLLMWITQC	Human	C-His-Avi
MHC-HM40N	HLA-A*02:01	Monomer	NY-ESO-1	SLLMWITQV	Human	C-His-Avi
MHC-HM40NB	HLA-A*02:01	Biotinylated Monomer	NY-ESO-1	SLLMWITQV	Human	C-His-Avi
MHC-HM40NT	HLA-A*02:01	Tetramer	NY-ESO-1	SLLMWITQV	Human	C-His-Avi
MHC-HM443	HLA-A*02:01	Monomer	PRAME	SLLQHLIGL	Human	C-His-Avi
MHC-HM443B	HLA-A*02:01	Biotinylated Monomer	PRAME	SLLQHLIGL	Human	C-His-Avi
MHC-HM443T	HLA-A*02:01	Tetramer	PRAME	SLLQHLIGL	Human	C-His-Avi
MHC-HM443TP	HLA-A*02:01	PE-Labeled Tetramer	PRAME	SLLQHLIGL	Human	C-His-Avi
MHC-HM402	HLA-A*02:01	Monomer	GP100	YLEPGPVTA	Human	C-His-Avi
MHC-HM402B	HLA-A*02:01	Biotinylated Monomer	GP100	YLEPGPVTA	Human	C-His-Avi
MHC-HM402T	HLA-A*02:01	Tetramer	GP100	YLEPGPVTA	Human	C-His-Avi
MHC-HM24MT	HLA-A*02:01	Tetramer	HPV16 E7	YMLDLQPET	Human	C-His-Avi
MHC-HM424	HLA-A*02:01	Monomer	HPV16 E7	YMLDLQPET	Human	C-His-Avi
MHC-HM424B	HLA-A*02:01	Biotinylated Monomer	HPV16 E7	YMLDLQPET	Human	C-His-Avi
HLA-A*02:03						
MHC-HM432	HLA-A*02:03	Monomer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM432B	HLA-A*02:03	Biotinylated Monomer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM432T	HLA-A*02:03	Tetramer	AFP	FMNKFIYEI	Human	C-His-Avi
MHC-HM432TP	HLA-A*02:03	Tetramer	AFP	FMNKFIYEI	Human	C-His-Avi
HLA-A*03:01						
MHC-HM456	HLA-A*03:01	Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM456B	HLA-A*03:01	Biotinylated Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM456TP	HLA-A*03:01	Tetramer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM423	HLA-A*03:01	Monomer	KRAS WT	VVGAGGVGK	Human	C-His-Avi
MHC-HM423B	HLA-A*03:01	Biotinylated Monomer	KRAS WT	VVGAGGVGK	Human	C-His-Avi
MHC-HM423T	HLA-A*03:01	Tetramer	KRAS WT	VVGAGGVGK	Human	C-His-Avi
MHC-HM418	HLA-A*03:01	Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM418B	HLA-A*03:01	Biotinylated Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM418T	HLA-A*03:01	Tetramer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM418TP	HLA-A*03:01	Tetramer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
HLA-A*11:01						
MHC-HM410	HLA-A*11:01	Monomer	LMP2	SSCSCPLTK	Human	C-His-Avi
MHC-HM410B	HLA-A*11:01	Biotinylated Monomer	LMP2	SSCSCPLTK	Human	C-His-Avi

Catalog #	Allele	Form	Antigen	Peptide	Species	Tag
MHC-HM410T	HLA-A*11:01	Tetramer	LMP2	SSCSSCPLTK	Human	C-His-Avi
MHC-HM455	HLA-A*11:01	Monomer	KRAS G12D	VVGADGVGK	Human	C-His-Avi
MHC-HM455B	HLA-A*11:01	Biotinylated Monomer	KRAS G12D	VVGADGVGK	Human	C-His-Avi
MHC-HE002B	HLA-A*11:01	Biotinylated Monomer	KRAS WT	VVGAGGVGK	Human	C-His-Avi
MHC-HE006	HLA-A*11:01	Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HE006B	HLA-A*11:01	Biotinylated Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM422	HLA-A*11:01	Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM422B	HLA-A*11:01	Biotinylated Monomer	KRAS G12V	VVGAVGVGK	Human	C-His-Avi
MHC-HM441	HLA-A*11:01	Monomer	KRAS G12A	VVVGAAAGVGK	Human	C-His-Avi
MHC-HM441B	HLA-A*11:01	Biotinylated Monomer	KRAS G12A	VVVGAAAGVGK	Human	C-His-Avi
MHC-HM441T	HLA-A*11:01	Tetramer	KRAS G12A	VVVGAAAGVGK	Human	C-His-Avi
MHC-HM439	HLA-A*11:01	Monomer	KRAS G12C	VVVGACGVGK	Human	C-His-Avi
MHC-HM439B	HLA-A*11:01	Biotinylated Monomer	KRAS G12C	VVVGACGVGK	Human	C-His-Avi
MHC-HM439T	HLA-A*11:01	Tetramer	KRAS G12C	VVVGACGVGK	Human	C-His-Avi
MHC-HM420	HLA-A*11:01	Monomer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HM420B	HLA-A*11:01	Biotinylated Monomer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HM420T	HLA-A*11:01	Tetramer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HM420TP	HLA-A*11:01	Tetramer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HM454	HLA-A*11:01	Monomer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HM454B	HLA-A*11:01	Biotinylated Monomer	KRAS G12D	VVVGADGVGK	Human	C-His-Avi
MHC-HE001	HLA-A*11:01	Monomer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HE001B	HLA-A*11:01	Biotinylated Monomer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM429	HLA-A*11:01	Monomer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM429B	HLA-A*11:01	Biotinylated Monomer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM429F	HLA-A*11:01	Monomer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM429T	HLA-A*11:01	Tetramer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM429TP	HLA-A*11:01	Tetramer	KRAS WT	VVVGAGGVGK	Human	C-His-Avi
MHC-HM440	HLA-A*11:01	Monomer	KRAS G12R	VVVGARGVGK	Human	C-His-Avi
MHC-HM440B	HLA-A*11:01	Biotinylated Monomer	KRAS G12R	VVVGARGVGK	Human	C-His-Avi
MHC-HM440T	HLA-A*11:01	Tetramer	KRAS G12R	VVVGARGVGK	Human	C-His-Avi
MHC-HM442	HLA-A*11:01	Monomer	KRAS G12S	VVVGASGVGK	Human	C-His-Avi
MHC-HM442B	HLA-A*11:01	Biotinylated Monomer	KRAS G12S	VVVGASGVGK	Human	C-His-Avi
MHC-HM442T	HLA-A*11:01	Tetramer	KRAS G12S	VVVGASGVGK	Human	C-His-Avi
MHC-HE005	HLA-A*11:01	Monomer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HE005B	HLA-A*11:01	Biotinylated Monomer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HM421	HLA-A*11:01	Monomer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HM421B	HLA-A*11:01	Biotinylated Monomer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HM421F	HLA-A*11:01	Monomer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HM421T	HLA-A*11:01	Tetramer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
MHC-HM421TP	HLA-A*11:01	Tetramer	KRAS G12V	VVVGAVGVGK	Human	C-His-Avi
HLA-A*24:02						
MHC-HM430	HLA-A*24:02	Monomer	Survivin 2B	AYACNTSTL	Human	C-His-Avi
MHC-HM430B	HLA-A*24:02	Biotinylated Monomer	Survivin 2B	AYACNTSTL	Human	N-His-Avi
MHC-HM430T	HLA-A*24:02	Tetramer	Survivin 2B	AYACNTSTL	Human	C-His-Avi

Catalog #	Allele	Form	Antigen	Peptide	Species	Tag
MHC-HM434	HLA-A*24:02	Monomer	MAGE-A3	IMPKAGLLI	Human	C-His-Avi
MHC-HM434B	HLA-A*24:02	Biotinylated Monomer	MAGE-A3	IMPKAGLLI	Human	C-His-Avi
MHC-HM434T	HLA-A*24:02	Tetramer	MAGE-A3	IMPKAGLLI	Human	C-His-Avi
MHC-HM433	HLA-A*24:02	Monomer	GP100 Intron 4	VYFFLPDHL	Human	C-His-Avi
MHC-HM433B	HLA-A*24:02	Biotinylated Monomer	GP100 Intron 4	VYFFLPDHL	Human	C-His-Avi
HLA-B*15:01						
MHC-HM448	HLA-B*15:01	Monomer	SARS-CoV-2 epitope	NQKLIANQF	Human	C-His-Avi
MHC-HM448B	HLA-B*15:01	Biotinylated Monomer	SARS-CoV-2 epitope	NQKLIANQF	Human	C-His-Avi
HLA-C*03:04						
MHC-HM438	HLA-C 03:04	Monomer	KRAS G12D	GADGVGKSAL	Human	C-His-Avi
MHC-HM438B	HLA-C 03:04	Biotinylated Monomer	KRAS G12D	GADGVGKSAL	Human	C-His-Avi
MHC-HM438T	HLA-C 03:04	Tetramer	KRAS G12D	GADGVGKSAL	Human	C-His-Avi
HLA-E*01:03						
MHC-HM40C	HLA-E*01:03	Monomer	--	VMAPKTLVL	Human	C-His-Avi
MHC-HM406	HLA-E*01:03	Monomer	--	VMAPRTLVL	Human	C-His-Avi
MHC-HM406B	HLA-E*01:03	Biotinylated Monomer	--	VMAPRTLVL	Human	C-His-Avi
MHC-HM406T	HLA-E*01:03	Tetramer	--	VMAPRTLVL	Human	C-His-Avi
MHC-HM406TB	HLA-E*01:03	Biotinylated Tetramer	--	VMAPRTLVL	Human	C-His-Avi
MHC-HM406TP	HLA-E*01:03	PE-Labeled Tetramer	--	VMAPRTLVL	Human	C-His-Avi
HLA-G						
HLG-CM41C	HLA-G	Monomer	--	RIIPRHLQL	Cynomolgus	C-His-Avi
HLG-CM41CB	HLA-G	Biotinylated Monomer	--	RIIPRHLQL	Cynomolgus	C-His-Avi
HLG-CM41CT	HLA-G	Tetramer	--	RIIPRHLQL	Cynomolgus	C-His-Avi
HLG-HM41C	HLA-G	Monomer	--	RIIPRHLQL	Human	C-His-Avi
HLG-HM41CB	HLA-G	Biotinylated Monomer	--	RIIPRHLQL	Human	C-His-Avi
HLG-HM41CT	HLA-G	Tetramer	--	RIIPRHLQL	Human	C-His-Avi
HLG-HM41CTB	HLA-G	Biotinylated Tetramer	--	RIIPRHLQL	Human	C-His-Avi
HLG-HM41CTP	HLA-G	PE-Labeled Tetramer	--	RIIPRHLQL	Human	C-His-Avi
HLG-RM41C	HLA-G	Monomer	--	RIIPRHLQL	Rhesus macaque	C-His-Avi
HLG-RM41CT	HLA-G	Tetramer	--	RIIPRHLQL	Rhesus macaque	C-His-Avi
HLG-HE41F	HLA-G	--	--	--	Human	C-His-Avi
Class I Alleles - Mouse						
MHC-MM453	H-2K (b)	Monomer	OVA	SIINFEKL	Mouse	C-His-Avi
MHC-MM452	Qa-1b	Monomer	Qdm	AMAPRTLLL	Mouse	C-His-Avi

Virus-like particle (VLP)-Displayed Antigens

KACTUS manufactures virus-like particle (VLP)-displayed target proteins/antigens. We've developed various transmembrane protein VLPs using our SAMS™ protein engineering platform to display antigens on VLPs. Our products include biotinylated, non-biotinylated, and fluorescently-labeled VLP proteins. They are suitable for SPR, ELISA, and other experimental scenarios to flexibly meet various experimental demands. Additionally, we offer custom VLP expression services, ensuring strict purity and thorough verification of biological activity.

Benefits of VLP-Displayed Antigens

VLPs are good at boosting the immune response. This makes them useful for immunization, especially with antigens that are usually present in low amounts or don't trigger a strong immune reaction by themselves. They also allow for soluble expression of multipass transmembrane proteins in their natural configuration.

Applications of VLP-Displayed Antigens

- Immunization
- Antibody Screening
- In vivo pharmacokinetic analysis
- CMC method development
- Analytical testing including ELISA, SPR, etc.

VLP-Displayed Antigens Product List:

Catalog #	Protein	Species	Biotinylated	Exact Sequence
A2B-HM00R	A2BR	Human	No	Met1-Leu332
GPR-MM05P	GPRC5D VLP	Mouse	No	Met1-Leu344
GPR-CM05P	GPRC5D VLP	Cynomolgus	No	Met1-Cys300
GPC-HE005	GPC3 VLP	Human	No	Gly510-Asn554
TSF-HM002	TM4SF1	Human	No	Met1-Cys202
GPC-HM003	GPC3 (438-554) VLP	Human	No	Arg438-Asn554
GPR-HM05CB	VLP Control	Human	Yes	
CLD-MM006	Claudin 6	Mouse	No	Met1-Val219
CLD-CM006	Claudin 6	Cynomolgus	No	Met1-Val220
CB2-HM0B2	CB2 VLP	Human	No	Met1-Cys360
VLP-HM00C	Envelope VLP Control	Human	No	
A2A-HM00R	A2AR	Human	No	Met1-Ser412
STR-HM002	SSTR2	Human	No	Met1-Ile369
CD2-HM122B	CD20 VLP	Human	No	Met1-Pro297
CD2-HM122	CD20 VLP	Human	No	Met1-Pro297
CCR-HM02BB	CCR2b	Human	Yes	Met1-Leu360
CCR-HM02B	CCR2b	Human	No	Met1-Leu360
CD2-CM124V	CD24	Cynomolgus	No	Ser26-Gly57
CLD-HM006B	Claudin 6	Human	Yes	Met1-Val220
CLD-HM006	Claudin 6	Human	No	Met1-Val220
GPR-HM05PB	GPRC5D	Human	Yes	Met1-Val345
GPR-HM05P	GPRC5D	Human	No	Met1-Val345
CD2-HM124V	CD24	Human	No	Ser27-Gly59
CLD-HE1822B	Claudin 18.2	Human	Yes	Met1-Val261
CLD-HE1822	Claudin 18.2	Human	No	Met1-Val261

Target Proteins for Bispecific Antibodies

Bispecific antibodies (BsAbs) are designed to engage two different targets, offering a novel approach in the treatment of various diseases, especially cancer. The selection of targets for these antibodies is crucial, as it determines their mechanism of action and therapeutic potential. The targets of BsAbs are chosen based on their expression in certain cancer types and their potential to activate the immune system against cancer cells. The bispecific nature of these antibodies allows for innovative therapeutic strategies, leveraging the body's own immune system to fight cancer more effectively. As research progresses, more targets are likely to emerge, further expanding the potential applications of bispecific antibodies in oncology and beyond.

Product Features:

- < 1EU / µg by the LAL method
- > 95% purity by Tris-Bis PAGE
- > 95% purity by HPLC
- HEK293 mammalian expression

Hot Targets offered by KACTUS:

CD19/CD3: In hematological cancers, especially B-cell malignancies, targeting CD19 on B-cells and CD3 on T-cells simultaneously can bring these cells into close proximity, leading to the activation of T-cells against the cancer cells.

CD20/CD3: Similar to CD19/CD3, this combination targets CD20 on B-cells and CD3 on T-cells, making it effective in treating B-cell malignancies.

HER2/CD3: Used in solid tumors, particularly HER2-positive breast cancers, this combination can effectively redirect T-cells to HER2-expressing cancer cells.

EpCAM/CD3: Targeting EpCAM, a marker on many epithelial cancers, and CD3 on T-cells, this combination is being explored in the treatment of various solid tumors.

EGFR/CD3: Engaging EGFR on tumor cells and CD3 on T-cells, this bispecific antibody is designed for the treatment of EGFR-expressing solid tumors.

PD-1/PD-L1: By targeting both PD-1 on immune cells and PD-L1 on tumor cells, these bispecific antibodies aim to enhance the immune response against tumors.

BCMA/CD3: In multiple myeloma, targeting BCMA on plasma cells and CD3 on T-cells is a promising strategy.

CD33/CD3: Aimed at acute myeloid leukemia (AML), this combination targets CD33 on AML cells and CD3 on T-cells.

GPC3/CD3: Used for targeting liver cancer, where GPC3 is a liver cancer-specific antigen.

PSMA/CD3: This combination targets PSMA on prostate cancer cells and CD3 on T-cells, showing potential in the treatment of prostate cancer.

Bispecific Target Proteins Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
BCM-HM117B	BCMA/TNFRSF17	Human	yes	C-His-Avi	Met1-Ala54
BCM-MM417B	BCMA/TNFRSF17	Mouse	yes	C-His-Avi	Met1-Thr49
BCM-CM117	BCMA/TNFRSF17	Cynomolgus/ Rhesus macaque	no	C-His	Met1-Ala53
BCM-CM217	BCMA/TNFRSF17	Cynomolgus/ Rhesus macaque	no	C-hFc	Met1-Ala53
BCM-HM117C	BCMA/TNFRSF17	Human	no	C-His	Met1-Ala54
BCM-HM117F	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM117	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM217	BCMA/TNFRSF17	Human	no	C-hFc	Met1-Ala54
BCM-MM217	BCMA/TNFRSF17	Mouse	no	C-hFc	Met1-Thr49
BCM-MM417	BCMA/TNFRSF17	Mouse	no	C-His-Avi	Met1-Thr49
BCM-HM417B	BCMA/TNFRSF17 Trimer	Human	yes	C-His-Avi	Met1-Ala54
BCM-HM417	BCMA/TNFRSF17 Trimer	Human	no	C-His-Avi	Met1-Ala54
CD1-CM119	CD19	Cynomolgus/ Rhesus macaque	no	C-His	Gln21-Trp291
CD1-HM119	CD19	Human	no	C-His	Pro20-Lys291
CD1-MM119	CD19	Mouse	no	C-His	Arg19-Gly287
CD2-HM122B	CD20 VLP	Human	yes		Met1-Pro297
CD2-HM122	CD20 VLP	Human	no		Met1-Pro297
CD2-HE120B	CD20/MS4A1	Human	yes	C-His-Avi	Ile141-Ser188
CD2-HE120	CD20/MS4A1	Human	no	C-His-Avi	Ile141-Ser188
CDD-HM101	CD3D/CD3 delta	Human	no	C-His	Phe22-Ala105
CDE-CM101B	CD3E	Cynomolgus	yes	C-His	Gln22-Asp117
CDE-HM101B	CD3E	Human	yes	C-His	Asp23-Asp126
CDE-CM101	CD3E	Cynomolgus	no	C-His	Gln22-Asp117
CDE-CM201	CD3E	Cynomolgus	no	C-hFc	Gln22-Asp117
CD3-HM20E	CD3E	Human	no	C-hFc	Asp23-Asp126(C119S, C122S)
CDE-HM101	CD3E	Human	no	C-His	Asp23-Asp126
CD3-CM2ED	CD3E 1-27	Cynomolgus	no	C-hFc-Avi	Asp22-Thr48
CD3-CM2EDB	CD3E 1-27 peptide	Cynomolgus	yes	C-hFc-Avi	Asp22-Thr48
CD3-HM2EDB	CD3E 1-27 peptide	Human	yes	C-hFc-Avi	Asp23-Thr48
CD3-HM2ED	CD3E 1-27 peptide	Human	no	C-hFc-Avi	Asp23-Thr48
CD3-CM201B	CD3E&CD3D	Cynomolgus	yes	C-hFc	Gln22-Asp117(CD3E) & Phe22-Ala105(CD3D)
CD3-HM505B	CD3E&CD3D	Human	yes	C-hFc-Avi	Asp23-Asp126(CD3E) & Phe22-Ala105(CD3D)
CD3-HM105B	CD3E&CD3D	Human	yes	C-His	Asp23-Glu120(CD3E) & Phe22-Ala105(CD3D)
CD3-CM101	CD3E&CD3D	Cynomolgus	no	C-His-Flag	Gln22-Asp117(CD3E) & Phe22-Ala105(CD3D)
CD3-CM201	CD3E&CD3D	Cynomolgus	no	C-hFc	Gln22-Asp117(CD3E) & Phe22-Ala105(CD3D)
CD3-HM205	CD3E&CD3D	Human	no	C-hFc	Asp23-Asp126(CD3E) & Phe22-Ala105(CD3D)
CD3-HM105	CD3E&CD3D	Human	no	C-His	Asp23-Glu120(CD3E) & Phe22-Ala105(CD3D)
CD3-MM205	CD3E&CD3D	Mouse	no	C-hFc	Asp23-Asp108(CD3E) & Phe22-Ala105(CD3D)
CD3-CM202B	CD3E&CD3G	Cynomolgus	yes	C-hFc	Gln22-Asp117(CD3E) & Gln23-Thr113(CD3G)

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
CD3-HM557B	CD3E&CD3G	Human	yes	C-hFc-Avi	Asp23-Asp126(CD3E) & Gln23-Ser116(CD3G)
CD3-HM157B	CD3E&CD3G	Human	yes	C-His	Asp23-Glu120(CD3E) & Gln23-Asn106(CD3G)
CD3-CM202	CD3E&CD3G	Cynomolgus	no	C-hFc	Gln22-Asp117(CD3E) & Gln23-Thr113(CD3G)
CD3-CM102	CD3E&CD3G	Cynomolgus	no	C-His-Flag	Gln22-Asp117(CD3E) & Gln23-Thr113(CD3G)
CD3-HM157	CD3E&CD3G	Human	no	C-His	Asp23-Glu120(CD3E) & Gln23-Asn106(CD3G)
CD3-HM257	CD3E&CD3G	Human	no	C-hFc	Asp23-Asp126(CD3E) & Gln23-Ser116(CD3G)
EGF-CM101	EGFR	Rhesus macaque	no	C-His	Leu25-Ser645
EGF-HM401B	EGFR/HER1	Human	yes	C-His-Avi	Leu25-Ser645
EGF-HM401F	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-HM201	EGFR/HER1	Human	no	C-hFc	Leu25-Ser645
EGF-HM401	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-MM101	EGFR/HER1	Mouse	no	C-His	Leu25-Ser647
EG8-HM154B	EGFRVIII	Human	yes	C-His-Avi	Leu25-Ser378
EG8-HM154F	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154P	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
CAM-HM4EPB	EpCAM/TROP1	Human	yes	C-His-Avi	Gln24-Lys265
CAM-CM0EP	EpCAM/TROP1	Cynomolgus/ Rhesus macaque	no	No Tag	Gln24-Lys265
CAM-CM1EP	EpCAM/TROP1	Cynomolgus/ Rhesus macaque	no	C-His	Gln24-Lys265
CAM-HM1EP	EpCAM/TROP1	Human	no	C-His	Gln24-Lys265
CAM-HM2EP	EpCAM/TROP1	Human	no	C-hFc	Gln24-Lys265
CD1-HM119F	FITC-Compatible CD19	Human	no	C-His	Pro20-Lys291
GPC-HM003	GPC3 (438-554) VLP	Human	no		Arg438-Asn554
GPC-HM004	GPC3 (510-554) VLP	Human	no		Gly510-Asn554
GPC-HE005	GPC3 VLP	Human	no		Gly510-Asn554
GPC-HM431B	GPC3/Glypican 3	Human	yes	C-His-Avi	Gln25-His559
GPC-CM131	GPC3/Glypican 3	Cynomolgus	no	C-His	Gln25-His559
GPC-HM131	GPC3/Glypican 3	Human	no	C-His	Gln25-His559
HER-HM402B	Her2/ErbB2	Human	yes	C-His-Avi	Thr23-Thr652
HER-CM102	Her2/ErbB2	Cynomolgus	no	C-His	Thr23-Thr652
HER-HM202	Her2/ErbB2	Human	no	C-hFc	Thr23-Thr652
HER-HM402	Her2/ErbB2	Human	no	C-His-Avi	Thr23-Thr652
HER-MM102	Her2/ErbB2	Mouse	no	N-His	Thr23-Thr653
HER-HM404B	Her2/ErbB2 Domain 4	Human	yes	C-His-Avi	Pro489-Cys630
HER-HM404	Her2/ErbB2 Domain 4	Human	no	C-His-Avi	Pro489-Cys630
PD1-HM401B	PD-1/PDCD1	Human	yes	C-His-Avi	Leu25-Gln167
PD1-HM501B	PD-1/PDCD1	Human	yes	C-hFc-Avi	Leu25-Gln167
PD1-MM201B	PD-1/PDCD1	Mouse	yes	C-hFc	Leu25-Gln167
PD1-DM201	PD-1/PDCD1	Canine	no	C-hFc	Leu25-Val170
PD1-CM101	PD-1/PDCD1	Cynomolgus	no	C-His	Pro21-Gln167
PD1-CM201	PD-1/PDCD1	Cynomolgus	no	C-hFc	Pro21-Gln167

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
PD1-HM101F	PD-1/PDCD1	Human	no	C-His	Leu25-Gln167
PD1-HM101	PD-1/PDCD1	Human	no	C-His	Leu25-Gln167
PD1-HM201	PD-1/PDCD1	Human	no	C-hFc	Leu25-Gln167
PD1-HM301	PD-1/PDCD1	Human	no	C-mFc	Leu25-Gln167
PD1-MM201	PD-1/PDCD1	Mouse	no	C-hFc	Leu25-Gln167
PDL-CM110B	PD-L1/B7-H1	Cynomolgus/ Rhesus macaque	yes	C-His	Phe19-Arg238
PDL-HM410B	PD-L1/B7-H1	Human	yes	C-His-Avi	Phe19-Arg238
PDL-MM110B	PD-L1/B7-H1	Mouse	yes	C-His	Phe19-Thr238
PDL-CM210	PD-L1/B7-H1	Cynomolgus	no	C-hFc	Phe19-Arg238
PDL-CM110	PD-L1/B7-H1	Cynomolgus/ Rhesus macaque	no	C-His	Phe19-Arg238
PDL-HM110	PD-L1/B7-H1	Human	no	C-His	Phe19-Arg238
PDL-HM11D	PD-L1/B7-H1	Human	no	C-His	Phe19-Ile226
PDL-HM210	PD-L1/B7-H1	Human	no	C-hFc	Phe19-Arg238
PDL-HM310	PD-L1/B7-H1	Human	no	C-mFc	Phe19-Arg238
PDL-MM210	PD-L1/B7-H1	Mouse	no	C-hFc	Phe19-Arg237
PDL-MM110	PD-L1/B7-H1	Mouse	no	C-His	Phe19-Thr238
PDL-HM402B	PD-L2/B7-DC	Human	yes	C-His-Avi	Leu20-Thr220
PDL-CM402	PD-L2/B7-DC	Cynomolgus	no	C-His	Leu20-Thr220
PDL-HM402	PD-L2/B7-DC	Human	no	C-His-Avi	Leu20-Thr220
PDL-MM102	PD-L2/B7-DC	Mouse	no	C-His	Leu20-Trp221
PSM-CM110B	PSMA/FOLH1	Cynomolgus	yes	N-His	Lys44-Ala750
PSM-MM110B	PSMA/FOLH1	Mouse	yes	N-His	Lys45-Ala752
PSM-CM110	PSMA/FOLH1	Cynomolgus	no	N-His	Lys44-Ala750
PSM-HM110	PSMA/FOLH1	Human	no	N-His	Lys44-Ala750
PSM-HM210	PSMA/FOLH1	Human	no	N-hFc	Lys44-Ala750
PSM-MM110	PSMA/FOLH1	Mouse	no	N-His	Lys45-Ala752
CD3-HM433B	Siglec-3/CD33	Human	yes	C-His-Avi	Asp18-His259
CD3-CM133	Siglec-3/CD33	Cynomolgus	no	C-His	Ser17-Leu248
CD3-HM433F	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
CD3-HM433	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
SIG-HM203	Siglec-3/CD33	Human	no	C-hFc	Asp18-His259
CD3-MM133	Siglec-3/CD33	Mouse	no	C-His	Asp18-Glu240

Immune Checkpoint Proteins

Immune checkpoints refer to a series of molecules expressed on immune cells that can regulate the degree of immune activation, preventing the immune system from becoming overactive. Dysregulation or dysfunction of immune checkpoints is one of the important causes of many diseases. In tumor cells, immune checkpoints are often in an activated state, preventing antigens from being presented to T cells, and thus the normal immune function of T cells is impaired, leading to immune escape. Common immune checkpoints include CTLA-4 (cytotoxic T lymphocyte-associated antigen-4) and PD-1 (programmed death receptor-1), which are receptors on the surface of T lymphocytes.

Regulating immune checkpoint molecules, such as using inhibitors targeting checkpoint molecules, can enhance the body's immune capability, thereby enabling immune cells to regain their killing efficacy. With the development of drugs targeting tumor immune checkpoints, especially successful antibodies targeting PD-1, programmed cell death ligand-1 (PD-L1), and CTLA-4, immune blockade therapy has become a new weapon against cancer.

Although in some cases immune checkpoint blockade therapy tends to have a more durable response compared to chemotherapy or targeted therapy, clinical data shows its limitation is the low response rate (10-30%) in most cancers. Therefore, more research is focused on mechanisms of non-responsiveness, as well as finding new treatment strategies by using novel immune checkpoint protein inhibitors or in combination with other drugs. Currently, immune checkpoints remain a hot topic in clinical research, with new targets and drugs emerging continuously.

Product Features:

- < 1EU / μ g by the LAL method
- > 95% purity by Tris-Bis PAGE
- > 95% purity by HPLC
- HEK293 mammalian expression

Hot Targets offered by KACTUS:

PD-1: This protein is a major target for immunotherapy, with several antibodies in various stages of clinical development.

PD-L1: Similar to PD-1, PD-L1 is a critical target, and inhibiting its interaction with PD-1 can reinvigorate T-cell activity against cancer cells.

CTLA-4: One of the first immune checkpoint inhibitors targeted, with successful therapies already on the market and others in development.

LAG-3: A transmembrane glycoprotein that negatively regulates T cells by binding to MHC II on antigen-presenting cells. This receptor is gaining attention in immunotherapy research due to its unique mechanism of action and potential in cancer treatment.

TIM-3: An emerging target with several antibodies in early-stage clinical trials.

TIGIT: This receptor has been a recent focus, with multiple antibodies in clinical development.

OX40: A target for activating the immune response, with several therapeutic antibodies in clinical trials.

4-1BB: A co-stimulatory molecule with potential for cancer immunotherapy, with some treatments in clinical trials.

CD40: A receptor on antigen-presenting cells, targeted by several monoclonal antibodies in different stages of clinical development.

Immune Checkpoint Proteins Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
BH7-HM473B	B7-H3	Human	yes	C-His-Avi	Leu29-Pro245
BH7-HM43BB	B7-H3 (4lg)/B7-H3b	Human	yes	C-His-Avi	Gly27-Thr461
BH7-HM23B	B7-H3 (4lg)/B7-H3b	Human	no	C-hFc	Gly27-Thr461
BH7-HM43B	B7-H3 (4lg)/B7-H3b	Human	no	C-His-Avi	Gly27-Thr461
BH7-CM173	B7-H3/CD276	Cynomolgus	no	C-His	Leu29-Glu465
BH7-HM273F	B7-H3/CD276	Human	no	C-hFc	Leu29-Pro245
BH7-HM173	B7-H3/CD276	Human	no	C-His	Leu29-Pro245
BH7-HM273	B7-H3/CD276	Human	no	C-hFc	Leu29-Pro245
BH7-MM173	B7-H3/CD276	Mouse	no	C-His	Val29-Ala248
BCM-HM117B	BCMA/TNFRSF17	Human	yes	C-His-Avi	Met1-Ala54
BCM-MM417B	BCMA/TNFRSF17	Mouse	yes	C-His-Avi	Met1-Thr49
BCM-CM117	BCMA/TNFRSF17	Cynomolgus/ Rhesus macaque	no	C-His	Met1-Ala53
BCM-CM217	BCMA/TNFRSF17	Cynomolgus/ Rhesus macaque	no	C-hFc	Met1-Ala53
BCM-HM117C	BCMA/TNFRSF17	Human	no	C-His	Met1-Ala54
BCM-HM117F	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM117	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM217	BCMA/TNFRSF17	Human	no	C-hFc	Met1-Ala54
BCM-MM217	BCMA/TNFRSF17	Mouse	no	C-hFc	Met1-Thr49
BCM-MM417	BCMA/TNFRSF17	Mouse	no	C-His-Avi	Met1-Thr49
BCM-HM417B	BCMA/TNFRSF17 Trimer	Human	yes	C-His-Avi	Met1-Ala54
BCM-HM417	BCMA/TNFRSF17 Trimer	Human	no	C-His-Avi	Met1-Ala54
CD4-HM401B	CD4/LEU3	Human	yes	C-His-Avi	Lys26-Trp390
CD4-HM401	CD4/LEU3	Human	no	C-His-Avi	Lys26-Trp390
CD4-HM204	CD4/LEU3	Human	no	C-hFc	Lys26-Trp390
CD4-MM101	CD4/LEU3	Mouse	no	C-His	Lys27-Thr394
CD4-RM101	CD4/LEU3	Rhesus macaque	no	C-His	Lys26-Trp390
CD5-HM501B	CD5	Human	yes	C-hFc-Avi	Arg25-Asn371
CD5-MM101B	CD5	Mouse	yes	C-His	Ser25-Pro371
CD5-RM405B	CD5	Rhesus macaque	yes	C-His-Avi	Arg25-Pro375
CD5-HM101	CD5	Human	no	C-His	Arg25-Asn371
CD5-HM501	CD5	Human	no	C-hFc-Avi	Arg25-Asn371
CD5-MM101	CD5	Mouse	no	C-His	Ser25-Pro371
CD5-RM405	CD5	Rhesus macaque	no	C-His-Avi	Arg25-Pro375
CD7-HM401B	CD7	Human	yes	C-His-Avi	Ala26-Pro180
CD7-MM101B	CD7	Mouse	yes	C-hFc	Gln24-Pro150
CD7-CM101	CD7	Cynomolgus	no	C-His	Ala26-Pro180
CD7-HM401	CD7	Human	no	C-His-Avi	Ala26-Pro180
CD7-MM101	CD7	Mouse	no	C-hFc	Gln24-Pro150
CD7-MM201	CD7	Mouse	no	C-His	Gln24-Pro150
CD7-HM401P	CD7	Human	no	C-His-Avi	Ala26-Pro180
CD8-HM48AB	CD8 alpha/CD8A	Human	yes	C-His-Avi	Ser22-Asp182
CD8-HM18A	CD8 alpha/CD8A	Human	no	C-His	Ser22-Asp182

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
CD8-MM18A	CD8 alpha/CD8A	Mouse	no	C-His	Lys28-Tyr196
CD1-CM119	CD19	Cynomolgus/ Rhesus macaque	no	C-His	Gln21-Trp291
CD1-HM119	CD19	Human	no	C-His	Pro20-Lys291
CD1-MM119	CD19	Mouse	no	C-His	Arg19-Gly287
CD7-CM170	CD27 Ligand/CD70	Cynomolgus	no	N-His	Gln39-Pro194
CD7-HM270	CD27 Ligand/CD70	Human	no	N-hFc	Gln39-Pro193
CD7-MM270	CD27 Ligand/CD70	Mouse	no	N-hFc	Ser45-Pro195
CDL-HM427B	CD27 Ligand/CD70 Trimer	Human	yes	N-His	Leu50-Pro193
CDL-HM427F	CD27 Ligand/CD70 Trimer	Human	no	N-His	Leu50-Pro193
CDL-HM427	CD27 Ligand/CD70 Trimer	Human	no	N-His	Leu50-Pro193
CD3-HM10L	CD30 Ligand/TNFSF8	Human	no	N-His	Gln63-Asp234
CD3-HM30L	CD30 Ligand/TNFSF8	Human	no	N-mFc	Gln63-Asp234
CD3-HM430B	CD30/TNFRSF8	Human	yes	C-His-Avi	Phe19-Lys379
CD3-CM130	CD30/TNFRSF8	Cynomolgus	no	C-His	Ala27-Pro394
CD3-HM230	CD30/TNFRSF8	Human	no	C-hFc	Phe19-Lys379
CD3-HM430	CD30/TNFRSF8	Human	no	C-His-Avi	Phe19-Lys379
CD3-HM138B	CD38	Human	yes	C-His-Avi	Val43-Ile300
CD3-CM138	CD38	Cynomolgus	no	C-His	Leu44-Ile301
CD3-HM238	CD38	Human	no	C-hFc	Val43-Ile300
CD3-HM138	CD38	Human	no	C-His	Val43-Ile300
CD3-MM138	CD38	Mouse	no	C-His	Leu45-Thr304
MUC-HM416B	CA125/MUC16	Human	yes	C-His-Avi	Gly12660-Met12923
MUC-HM426B	CA125/MUC16	Human	yes	C-His-Avi	Asp12783-Ser13467
MUC-HM126	CA125/MUC16	Human	no	C-His	Asp12783-Ser13467
MUC-HM416	CA125/MUC16	Human	no	C-His-Avi	Gly12660-Met12923
CEA-DM101	CEACAM-1/CD66a	Canine	no	C-His	Gln35-Gly424
CEA-HM201	CEACAM-1/CD66a	Human	no	C-His	Gln35-Gly428
CEA-MM101	CEACAM-1/CD66a	Mouse	no	C-His	Glu35-Gly428
CEA-HM103	CEACAM-3	Human	no	C-His	Lys35-Gly155
CEA-HM203	CEACAM-3	Human	no	C-hFc	Lys35-Gly155
CAM-HM415B	CEACAM-5/CD66e	Human	yes	C-His-Avi	Lys35-Ala685
CAM-CM105	CEACAM-5/CD66e	Cynomolgus	no	C-His	Gln35-Gly685
CAM-HM105	CEACAM-5/CD66e	Human	no	C-His	Lys35-Ala685
CAM-HM1D1	CEACAM-5/CD66e (145-322)	Human	no	C-His	Pro145-Pro322
CAM-HM1D2	CEACAM-5/CD66e (323-500)	Human	no	C-His	Pro323-Leu500
CAM-HM1D3	CEACAM-5/CD66e (501-685)	Human	no	C-His	Pro501-Ala685
CAM-HM406B	CEACAM-6/CD66c	Human	yes	C-His-Avi	Lys35-Gly320
CAM-CM106	CEACAM-6/CD66c	Cynomolgus	no	C-His	Gln35-Gly320
CAM-HM406	CEACAM-6/CD66c	Human	no	C-His-Avi	Lys35-Gly320
CEA-HM207	CEACAM-7	Human	no	C-hFc	Thr36-Ser242
CEA-HM107	CEACAM-7	Human	no	C-His	Thr36-Ser242
CAM-HM408B	CEACAM-8/CD66b	Human	yes	C-His-Avi	Gln35-Ser319
CEA-HM108	CEACAM-8/CD66b	Human	no	C-His	Gln35-Ser319
CLE-HM42AB	CLEC12A/MICL/CLL-1	Human	yes	N-His,C-Avi	His65-Ala265

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
CLE-HM52AB	CLEC12A/MICL/CLL-1	Human	yes	N-hFc-Avi	His65-Ala265
CLE-CM12A	CLEC12A/MICL/CLL-1	Cynomolgus	no	N-His	His32-Ala232
CLE-HM12AF	CLEC12A/MICL/CLL-1	Human	no	N-His	His65-Ala265
CLE-HM12A	CLEC12A/MICL/CLL-1	Human	no	N-His	His65-Ala265
CLE-HM22A	CLEC12A/MICL/CLL-1	Human	no	N-hFc	His65-Ala265
CLE-MM12A	CLEC12A/MICL/CLL-1	Mouse	no	N-His	Tyr65-Arg267
EGF-CM101	EGFR	Rhesus macaque	no	C-His	Leu25-Ser645
EGF-HM401B	EGFR/HER1	Human	yes	C-His-Avi	Leu25-Ser645
EGF-HM401F	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-HM201	EGFR/HER1	Human	no	C-hFc	Leu25-Ser645
EGF-HM401	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-MM101	EGFR/HER1	Mouse	no	C-His	Leu25-Ser647
EG8-HM154B	EGFRVIII	Human	yes	C-His-Avi	Leu25-Ser378
EG8-HM154F	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154P	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
CAM-HM4EPB	EpCAM/TROP1	Human	yes	C-His-Avi	Gln24-Lys265
CAM-CM0EP	EpCAM/TROP1	Cynomolgus/ Rhesus macaque	no	No Tag	Gln24-Lys265
CAM-CM1EP	EpCAM/TROP1	Cynomolgus/ Rhesus macaque	no	C-His	Gln24-Lys265
CAM-HM1EP	EpCAM/TROP1	Human	no	C-His	Gln24-Lys265
CAM-HM2EP	EpCAM/TROP1	Human	no	C-hFc	Gln24-Lys265
FAP-CM401B	FAP	Cynomolgus	yes	N-His-Avi	Leu26-Asp760
FAP-HM401B	FAP	Human	yes	N-His-Avi	Leu26-Asp760
FAP-CM101	FAP	Cynomolgus	no	N-His	Leu26-Asp760
FAP-HM201	FAP	Human	no	N-hFc	Leu26-Asp760
FAP-HM101	FAP	Human	no	N-His	Leu26-Asp760
FAP-MM101	FAP	Mouse	no	N-His	Leu26-Asp761
CD1-HM119F	FITC-Compatible CD19	Human	no	C-His	Pro20-Lys291
FOL-HM4R1B	FOLR1	Human	yes	C-His-Avi	Arg25-Met233
FOL-CM1R1	FOLR1	Cynomolgus/ Rhesus macaque	no	C-His	Arg25-Met233
FOL-HM4R1F	FOLR1	Human	no	C-His-Avi	Arg25-Met233
FOL-HM2R2	FOLR1	Human	no	C-hFc	Arg25-Met233
FOL-HM4R1	FOLR1	Human	no	C-His-Avi	Arg25-Met233
FOL-MM1R1	FOLR1	Mouse	no	C-His	Thr25-Ser232
FOL-CM1R2	FOLR2	Cynomolgus	no	C-His	Gln9-His187
FOL-HM1R2	FOLR2	Human	no	C-His	Thr17-Met228
FOL-MM1R2	FOLR2	Mouse	no	C-His	Arg21-Ser227
FOL-HM1R4	FOLR4/Juno	Human	no	C-His	Gly20-Ser228
FOL-MM1R4	FOLR4/Juno	Mouse	no	C-His	Gly20-Gly222
GPC-HM431B	GPC3/Glypican 3	Human	yes	C-His-Avi	Gln25-His559
GPC-CM131	GPC3/Glypican 3	Cynomolgus	no	C-His	Gln25-His559
GPC-HM131	GPC3/Glypican 3	Human	no	C-His	Gln25-His559

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
GCC-HM401B	GUCY2C/Guanylyl cyclase C	Human	yes	C-His-Avi	Ser24-Gln430
GCC-MM401B	GUCY2C/Guanylyl cyclase C	Mouse	yes	C-His-Avi	Val20-Met433
GCC-DM101	GUCY2C/Guanylyl cyclase C	Canine	no	C-His	Tyr21-Gln430
GCC-CM101	GUCY2C/Guanylyl cyclase C	Cynomolgus	no	C-His	Ser24-Gln430
GCC-HM201	GUCY2C/Guanylyl cyclase C	Human	no	C-hFc	Ser24-Gln430
GCC-HM401	GUCY2C/Guanylyl cyclase C	Human	no	C-His-Avi	Ser24-Gln430
GCC-MM401	GUCY2C/Guanylyl cyclase C	Mouse	no	C-His-Avi	Val20-Met433
HER-HM402B	Her2/ErbB2	Human	yes	C-His-Avi	Thr23-Thr652
HER-CM102	Her2/ErbB2	Cynomolgus	no	C-His	Thr23-Thr652
HER-HM202	Her2/ErbB2	Human	no	C-hFc	Thr23-Thr652
HER-HM402	Her2/ErbB2	Human	no	C-His-Avi	Thr23-Thr652
HER-MM102	Her2/ErbB2	Mouse	no	N-His	Thr23-Thr653
HER-HM404B	Her2/ErbB2 Domain 4	Human	yes	C-His-Avi	Pro489-Cys630
HER-HM404	Her2/ErbB2 Domain 4	Human	no	C-His-Avi	Pro489-Cys630
HER-CM403	Her3	Cynomolgus/ Rhesus macaque	no	C-His	Ser20-His641
HER-HM403B	Her3/ErbB3	Human	yes	C-His-Avi	Ser20-Thr643
HER-HM403F	Her3/ErbB3	Human	no	C-His-Avi	Ser20-Thr643
HER-HM203	Her3/ErbB3	Human	no	C-hFc	Ser20-Thr643
HER-HM403	Her3/ErbB3	Human	no	C-His-Avi	Ser20-Thr643
HER-MM103	Her3/ErbB3	Mouse	no	C-His	Ser20-His641
HER-HM4B4B	Her4/ErbB4	Human	yes	C-His-Avi	Gln26-Pro651
HER-HM204	Her4/ErbB4	Human	no	C-hFc	Gln26-Pro651
HER-HM4B4	Her4/ErbB4	Human	no	C-His-Avi	Gln26-Pro651
ILR-HM4R1B	IL-13Ra1	Human	yes	C-His-Avi	Ala27-Thr343
ILR-CM1R1	IL-13Ra1	Cynomolgus	no	C-His	Ala25-Thr341
ILR-HM1R1	IL-13Ra1	Human	no	C-His	Ala27-Thr343
ILR-HM2R1	IL-13Ra1	Human	no	C-hFc	Ala27-Thr343
ILR-MM1R1	IL-13Ra1	Mouse	no	C-His	Ala26-Thr340
ILR-HM2R2	IL-13Ra2	Human	no	C-hFc	Asp27-Leu342
ILR-MM1R2	IL-13Ra2	Mouse	no	C-His	Leu22-Lys334
ILR-RM1R2	IL-13Ra2	Rat	no	C-His	Leu24-Lys336
ILR-RM2R2	IL-13Ra2	Rat	no	C-hFc	Leu24-Lys336
IL3-HM1RAB	IL-3 R alpha/CD123	Human	yes	C-His-Avi	Thr19-Arg305
IL3-CM1RA	IL-3 R alpha/CD123	Cynomolgus	no	C-His	Arg18-Arg302
IL3-HM2RA	IL-3 R alpha/CD123	Human	no	C-hFc	Thr19-Arg305
IL3-HM1RA	IL-3 R alpha/CD123	Human	no	C-His	Thr19-Arg305
MSL-CM180B	MSLN/Mesothelin	Cynomolgus	yes	C-His	Asp406-Gly690
MSL-HM480B	MSLN/Mesothelin	Human	yes	C-His-Avi	Glu296-Gly580
MSL-HM580B	MSLN/Mesothelin	Human	yes	C-hFc-Avi	Glu296-Gly580
MSL-MM180B	MSLN/Mesothelin	Mouse	yes	C-His	Asp298-Ser600
MSL-CM180	MSLN/Mesothelin	Cynomolgus	no	C-His	Asp406-Gly690
MSL-CM280	MSLN/Mesothelin	Cynomolgus	no	C-hFc	Asp296-Gly580
MSL-CM281	MSLN/Mesothelin	Cynomolgus	no	C-His	Asp296-Ser598
MSL-HM280F	MSLN/Mesothelin	Human	no	C-hFc	Glu296-Gly580

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
MSL-HM480F	MSLN/Mesothelin	Human	no	C-His-Avi	Glu296-Gly580
MSL-HM181	MSLN/Mesothelin	Human	no	C-His	Glu296-Ser598
MSL-HM183	MSLN/Mesothelin	Human	no	C-His	Glu296-Leu591
MSL-HM280	MSLN/Mesothelin	Human	no	C-hFc	Glu296-Gly580
MSL-HM20D	MSLN/Mesothelin	Human	no	C-hFc	Ala488-Ser600
MSL-HM480	MSLN/Mesothelin	Human	no	C-His-Avi	Glu296-Gly580
MSL-MM180	MSLN/Mesothelin	Mouse	no	C-His	Asp298-Ser600
MSL-HM480P	MSLN/Mesothelin	Human	no	C-His-Avi	Glu296-Gly580
MSL-HM182	MSLN/Mesothelin (M593V)	Human	no	C-His	Glu296-Ser598 (M593V)
NEC-HM404B	Nectin-4	Human	yes	C-His-Avi	Gly32-Val351
NEC-CM104	Nectin-4	Cynomolgus	no	C-His	Gly32-Val351
NEC-HM204	Nectin-4	Human	no	C-hFc	Gly32-Ser349
NEC-HM404	Nectin-4	Human	no	C-His-Avi	Gly32-Val351
NEC-MM104	Nectin-4	Mouse	no	C-His	Gly31-Ser347
NEC-HM414B	Nectin-4 IgV Domain	Human	yes	C-His-Avi	Gly32-Leu146
NEC-HM414	Nectin-4 IgV Domain	Human	no	C-His-Avi	Gly32-Leu146
NKG-HM42DB	NKG2D/CD314	Human	yes	N-His-Avi	Phe78-Val216
NKG-CM12D	NKG2D/CD314	Cynomolgus	no	N-His	Ile73-Val216
NKG-HM22DF	NKG2D/CD314	Human	no	N-hFc-Flag	Phe78-Val216
NKG-HM22D	NKG2D/CD314	Human	no	N-hFc-Flag	Phe78-Val216
NKG-HM42D	NKG2D/CD314	Human	no	N-His-Avi	Phe78-Val216
NKG-MM12D	NKG2D/CD314	Mouse	no	N-His	Phe90-Val232
NKG-MM22D	NKG2D/CD314	Mouse	no	N-hFc	Phe90-Val232
PCA-HM201	PSCA	Human	no	N-hFc	Leu12-Ser86
PCA-MM201	PSCA	Mouse	no	N-His	Leu21-Asn95
PCA-MM101	PSCA	Mouse	no	N-hFc	Leu21-Asn95
PSM-CM110B	PSMA/FOLH1	Cynomolgus	yes	N-His	Lys44-Ala750
PSM-MM110B	PSMA/FOLH1	Mouse	yes	N-His	Lys45-Ala752
PSM-CM110	PSMA/FOLH1	Cynomolgus	no	N-His	Lys44-Ala750
PSM-HM110	PSMA/FOLH1	Human	no	N-His	Lys44-Ala750
PSM-HM210	PSMA/FOLH1	Human	no	N-hFc	Lys44-Ala750
PSM-MM110	PSMA/FOLH1	Mouse	no	N-His	Lys45-Ala752
ROR-HM401B	ROR1	Human/Cynomolgus/ Rhesus macaque	yes	C-His-Avi	Gln30-Glu403
ROR-DM101	ROR1	Canine	no	C-His	Ala22-Glu477
ROR-HB101	ROR1	Human	no	C-His	Met453-Asn783
ROR-HM401	ROR1	Human/Cynomolgus/ Rhesus macaque	no	C-His-Avi	Gln30-Glu403
ROR-HM201	ROR1	Human/Cynomolgus/ Rhesus macaque	no	C-hFc	Gln30-Glu403
ROR-MM101	ROR1	Mouse	no	C-His	Gln30-Tyr406
ROR-HM10F	ROR1 (165-305, Frizzled Domain)	Human/Cynomolgus/ Rhesus macaque	no	C-His	Glu165-Asp305
ROR-HM11F	ROR1 (30-305,Ig-like&Frizzled Domain)	Human/Cynomolgus/ Rhesus macaque	no	C-His	Gln30-Asp305

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
ROR-HM10K	ROR1 (308-395, Kringle Domain)	Human/Cynomolgus/ Rhesus macaque	no	C-His	Asn308-Asp395
ROR-HM10I	ROR1 (39-151, Ig-like Domain)	Human/Cynomolgus/ Rhesus macaque	no	C-His	Glu39-Gly151
SIG-HM412B	Siglec-2/CD22	Human	yes	C-His-Avi	Asp20-Arg687
SIG-HM222F	Siglec-2/CD22	Human	no	C-hFc	Asp20-Arg687
SIG-HM122	Siglec-2/CD22	Human	no	C-His	Asp20-Arg687
SIG-MM122	Siglec-2/CD22	Mouse	no	C-His	Ser22-Arg702
SIG-CM122	Siglec-2/CD22	Rhesus macaque	no	C-His	Ser20-Arg686
CD3-HM433B	Siglec-3/CD33	Human	yes	C-His-Avi	Asp18-His259
CD3-CM133	Siglec-3/CD33	Cynomolgus	no	C-His	Ser17-Leu248
CD3-HM433F	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
SIG-HM203	Siglec-3/CD33	Human	no	C-hFc	Asp18-His259
CD3-HM433	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
CD3-MM133	Siglec-3/CD33	Mouse	no	C-His	Asp18-Glu240
SIG-HM222	Siglec2/CD22	Human	no	C-hFc	Asp20-Arg687
SMF-HM407B	SLAMF7/CRACC/CD319	Human	yes	C-His-Avi	Ser23-Met226
SMF-CM107	SLAMF7/CRACC/CD319	Cynomolgus	no	C-His	Ser23-Met226
SMF-HM207	SLAMF7/CRACC/CD319	Human	no	C-hFc	Ser23-Met226
SMF-HM407	SLAMF7/CRACC/CD319	Human	no	C-His-Avi	Ser23-Met226
SMF-HM307	SLAMF7/CRACC/CD319	Human	no	C-mFc	Ser23-Met226
SMF-MM107	SLAMF7/CRACC/CD319	Mouse	no	C-His	Ser23-Gly224
5T4-HM401F	TPBG/5T4	Human	no	C-His-Avi	Ser32-Ser355
VEGF-HM4R1B	VEGF R1/FLT-1	Human	yes	C-His-Avi	Ser27-Asn756
VEGF-HM4R1	VEGF R1/FLT-1	Human	no	C-His-Avi	Ser27-Asn756
VEGF-HM4R2B	VEGF R2/KDR	Human	yes	C-His-Avi	Ala20-Glu764
VEGF-HM3R2	VEGF R2/KDR	Human	no	C-mFc	Ala20-Glu764
VEGF-HM4R2	VEGF R2/KDR	Human	no	C-His-Avi	Ala20-Glu764
VEGF-MM1R2	VEGF R2/KDR	Mouse	no	C-His	Ala20-Glu762
VEGF-CM1R2	VEGF R2/KDR	Rhesus macaque	no	C-His	Ala20-Glu764
VEGF-HM4R3B	VEGF R3/FLT4	Human	yes	C-His-Avi	Tyr25-Ile776
VEGF-HM4R3	VEGF R3/FLT4	Human	no	C-His-Avi	Tyr25-Ile776
VEGF-HM2R3	VEGF R3/FLT4	Human	no	C-hFc	Tyr25-Ile776
VEGF-MM2R3	VEGF R3/FLT4	Mouse	no	C-hFc	Tyr25-Glu775

Target Proteins for Antibody-Drug Conjugates (ADCs)

Antibody-drug conjugates (ADCs) represent a significant advancement in targeted cancer therapy, combining the specificity of antibodies with the potency of cytotoxic drugs. This innovative approach leverages the ability of monoclonal antibodies to accurately target and bind to specific antigens present on the surface of cancer cells. Once bound, the ADC is internalized into the cancer cell, releasing the cytotoxic agent. The structure of an ADC typically comprises three components: a monoclonal antibody specific to a tumor-associated antigen, a potent cytotoxic (or 'payload') drug, and a linker that connects the drug to the antibody.

ADCs are designed to maximize the therapeutic index by increasing the concentration of the drug at the tumor site while minimizing systemic exposure, thereby reducing the adverse side effects commonly seen with traditional chemotherapy. The precision of ADCs allows for the selective destruction of cancer cells while sparing healthy cells, offering a more targeted approach to cancer treatment.

Hot targets for ADC in cancer therapy are typically proteins or antigens that are highly expressed on the surface of cancer cells but have limited expression on normal cells. These targets are crucial for the effectiveness of ADCs, as they ensure that the cytotoxic payload is delivered specifically to cancer cells, minimizing damage to healthy tissue. Several ADCs have been approved for clinical use, and many more are in various stages of development, showing promise for the future of oncology treatments.

Hot Targets offered by KACTUS:

HER2 (Human Epidermal Growth Factor Receptor 2): Overexpressed in certain types of breast cancer and other solid tumors, making it a prime target for ADCs. Trastuzumab emtansine (Kadcyla) is a well-known HER2-targeting ADC.

CD30: A marker for Hodgkin lymphoma and anaplastic large cell lymphoma. Brentuximab vedotin (Adcetris) targets CD30.

CD22 (Siglec-2): A protein found on the surface of B cells, making it a target in certain B-cell malignancies. Inotuzumab ozogamicin is an ADC targeting CD22.

CD33 (Siglec-3): Commonly expressed in acute myeloid leukemia (AML). Gemtuzumab ozogamicin is an ADC that targets CD33.

BCMA (B-Cell Maturation Antigen): A target for multiple myeloma. Several ADCs targeting BCMA are in development or clinical trials.

EGFR (Epidermal Growth Factor Receptor): Overexpressed in various solid tumors, including colorectal and lung cancers. There are ongoing efforts to develop effective EGFR-targeting ADCs.

PSMA (Prostate-Specific Membrane Antigen): Expressed in prostate cancer, making it a target for ADC development in this area.

TROP-2 (Trophoblast Cell-Surface Antigen 2): Overexpressed in several epithelial cancers, including triple-negative breast cancer. Sacituzumab govitecan targets TROP-2.

GPC3 (Glypican-3): Expressed in liver cancer and is a potential target for ADCs in hepatocellular carcinoma.

CD19: A common antigen on B-cell malignancies, with multiple ADCs in development targeting this marker.

ADC Target Protein Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
BCM-HM117B	BCMA/TNFRSF17	Human	yes	C-His-Avi	Met1-Ala54
BCM-MM417B	BCMA/TNFRSF17	Mouse	yes	C-His-Avi	Met1-Thr49
BCM-CM117	BCMA/TNFRSF17	Cynomolgus/Rhesus macaque	no	C-His	Met1-Ala53
BCM-CM217	BCMA/TNFRSF17	Cynomolgus/Rhesus macaque	no	C-hFc	Met1-Ala53
BCM-HM117C	BCMA/TNFRSF17	Human	no	C-His	Met1-Ala54
BCM-HM117F	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM117	BCMA/TNFRSF17	Human	no	C-His-Avi	Met1-Ala54
BCM-HM217	BCMA/TNFRSF17	Human	no	C-hFc	Met1-Ala54
BCM-MM217	BCMA/TNFRSF17	Mouse	no	C-hFc	Met1-Thr49
BCM-MM417	BCMA/TNFRSF17	Mouse	no	C-His-Avi	Met1-Thr49
BCM-HM417B	BCMA/TNFRSF17 Trimer	Human	yes	C-His-Avi	Met1-Ala54
BCM-HM417	BCMA/TNFRSF17 Trimer	Human	no	C-His-Avi	Met1-Ala54
CD1-CM119	CD19	Cynomolgus/Rhesus macaque	no	C-His	Gln21-Trp291
CD1-HM119	CD19	Human	no	C-His	Pro20-Lys291
CD1-MM119	CD19	Mouse	no	C-His	Arg19-Gly287
CD3-HM10L	CD30 Ligand/TNFSF8	Human	no	N-His	Gln63-Asp234
CD3-HM30L	CD30 Ligand/TNFSF8	Human	no	N-mFc	Gln63-Asp234
CD3-HM430B	CD30/TNFRSF8	Human	yes	C-His-Avi	Phe19-Lys379
CD3-CM130	CD30/TNFRSF8	Cynomolgus	no	C-His	Ala27-Pro394
CD3-HM230	CD30/TNFRSF8	Human	no	C-hFc	Phe19-Lys379
CD3-HM430	CD30/TNFRSF8	Human	no	C-His-Avi	Phe19-Lys379
EGF-CM101	EGFR	Rhesus macaque	no	C-His	Leu25-Ser645
EGF-HM401B	EGFR/HER1	Human	yes	C-His-Avi	Leu25-Ser645
EGF-HM401F	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-HM201	EGFR/HER1	Human	no	C-hFc	Leu25-Ser645
EGF-HM401	EGFR/HER1	Human	no	C-His-Avi	Leu25-Ser645
EGF-MM101	EGFR/HER1	Mouse	no	C-His	Leu25-Ser647
EG8-HM154B	EGFRVIII	Human	yes	C-His-Avi	Leu25-Ser378
EG8-HM154F	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
EG8-HM154P	EGFRVIII	Human	no	C-His-Avi	Leu25-Ser378
CD1-HM119F	FITC-Compatible CD19	Human	no	C-His	Pro20-Lys291
GPC-HM003	GPC3 (438-554) VLP	Human	no		Arg438-Asn554
GPC-HE005	GPC3 VLP	Human	no		Gly510-Asn554
GPC-HM431B	GPC3/Glypican 3	Human	yes	C-His-Avi	Gln25-His559
GPC-CM131	GPC3/Glypican 3	Cynomolgus	no	C-His	Gln25-His559
GPC-HM131	GPC3/Glypican 3	Human	no	C-His	Gln25-His559
HER-HM402B	Her2/ErbB2	Human	yes	C-His-Avi	Thr23-Thr652
HER-CM102	Her2/ErbB2	Cynomolgus	no	C-His	Thr23-Thr652
HER-HM202	Her2/ErbB2	Human	no	C-hFc	Thr23-Thr652
HER-HM402	Her2/ErbB2	Human	no	C-His-Avi	Thr23-Thr652

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
HER-MM102	Her2/ErbB2	Mouse	no	N-His	Thr23-Thr653
HER-HM404B	Her2/ErbB2 Domain 4	Human	yes	C-His-Avi	Pro489-Cys630
HER-HM404	Her2/ErbB2 Domain 4	Human	no	C-His-Avi	Pro489-Cys630
PSM-CM110B	PSMA/FOLH1	Cynomolgus	yes	N-His	Lys44-Ala750
PSM-MM110B	PSMA/FOLH1	Mouse	yes	N-His	Lys45-Ala752
PSM-CM110	PSMA/FOLH1	Cynomolgus	no	N-His	Lys44-Ala750
PSM-HM210	PSMA/FOLH1	Human	no	N-hFc	Lys44-Ala750
PSM-HM110	PSMA/FOLH1	Human	no	N-His	Lys44-Ala750
PSM-MM110	PSMA/FOLH1	Mouse	no	N-His	Lys45-Ala752
SIG-HM122	Siglec-2/CD22	Human	no	C-His	Asp20-Arg687
SIG-MM122	Siglec-2/CD22	Mouse	no	C-His	Ser22-Arg702
SIG-CM122	Siglec-2/CD22	Rhesus macaque	no	C-His	Ser20-Arg686
CD3-HM433B	Siglec-3/CD33	Human	yes	C-His-Avi	Asp18-His259
CD3-CM133	Siglec-3/CD33	Cynomolgus	no	C-His	Ser17-Leu248
CD3-HM433F	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
CD3-HM433	Siglec-3/CD33	Human	no	C-His-Avi	Asp18-His259
SIG-HM203	Siglec-3/CD33	Human	no	C-hFc	Asp18-His259
CD3-MM133	Siglec-3/CD33	Mouse	no	C-His	Asp18-Glu240
SIG-HM222	Siglec2/CD22	Human	no	C-hFc	Asp20-Arg687
TRP-HM421B	TROP-2/TACSTD2	Human	yes	C-His-Avi	His27-Thr274
TRP-CM121	TROP-2/TACSTD2	Cynomolgus	no	C-His	His27-Thr274
TRP-HM121	TROP-2/TACSTD2	Human	no	C-His	His27-Thr274
TRP-HM221	TROP-2/TACSTD2	Human	no	C-hFc	His27-Thr274
TRP-MM121	TROP-2/TACSTD2	Mouse	no	C-His	Gln25-Gly270
TRP-RM121	TROP-2/TACSTD2	Rat	no	C-His	Gln25-Gly270

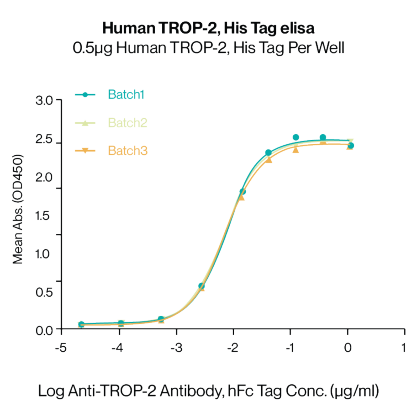
Proteins for Quality Testing

CMC (Chemistry, Manufacturing, and Controls) is one of the key links for the successful development and registration of a drug, requiring high-quality proteins with high stability to establish production control parameters and imposing higher requirements on the stability and activity of the proteins. KACTUS' recombinant protein products possess high stability and excellent activity, which can be applied in the CMC method development of antibody drugs.

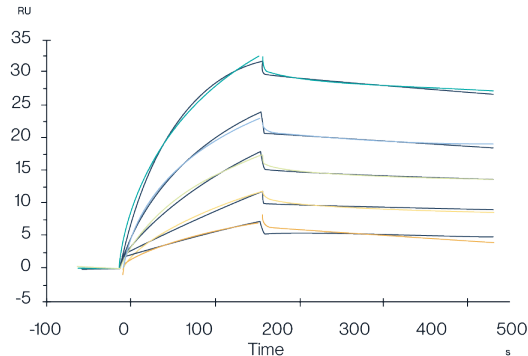
Product Features:

- < 1EU / μg by the LAL method
- > 95% purity by Tris-Bis PAGE
- > 95% purity by HPLC
- HEK293 mammalian expression

Performance Validation:



Verified by ELISA, recombinant Human Trop-2 protein exhibits good batch-to-batch stability.



Verified by SPR, biotinylated Claudin 6-VLP protein can bind well with its respective antibodies.

Proteins for Quality Testing Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
BBL-CM241	4-1BB Ligand/TNFSF9	Cynomolgus	no	C-hFc	Arg68-Glu251
BBL-HM241B	4-1BB Ligand/TNFSF9 Trimer	Human	yes	N-monomeric hFc	Arg71-Glu254
BBL-HM141	4-1BB Ligand/TNFSF9 Trimer	Human	no	N-His	Arg71-Glu254
BBL-HM241	4-1BB Ligand/TNFSF9 Trimer	Human	no	N-monomeric hFc	Arg71-Glu254
BB4-HM541B	4-1BB/TNFRSF9	Human	yes	C-hFc-Avi	Leu24-Gln186
BB4-HM441B	4-1BB/TNFRSF9	Human	yes	C-His-Avi	Leu24-Gln186
BB4-CM141	4-1BB/TNFRSF9	Cynomolgus/Rhesus macaque	no	C-His	Leu24-Gln186
BB4-HM141	4-1BB/TNFRSF9	Human	no	C-His	Leu24-Gln186
BB4-HM541	4-1BB/TNFRSF9	Human	no	C-hFc-Avi	Leu24-Gln186
BB4-MM141	4-1BB/TNFRSF9	Mouse	no	C-His	Val24-Leu211
APN-HM401B	ANGPT2/Angiopoietin-2	Human	yes	N-His-Avi	Lys275-Phe496

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
APN-HM401	ANGPT2/Angiopoietin-2	Human	no	N-His-Avi	Lys275-Phe496
APN-MM101	ANGPT2/Angiopoietin-2	Mouse	no	C-His	Lys275-Phe496
AXL-HM401B	AXL	Human	yes	C-His-Avi	Ala26-Pro449
AXL-HM201B	AXL	Human	yes	C-hFc	Ala26-Pro449
AXL-CM102	AXL	Cynomolgus	no	C-His	Glu33-Pro449
AXL-HM101	AXL	Human	no	C-His	Glu33-Ser442
AXL-HM201	Axl	Human	no	C-hFc	Ala26-Pro449
AXL-HM401	AXL	Human	no	C-His-Avi	Ala26-Pro449
AXL-MM101	AXL	Mouse	no	C-His	His20-Trp445
BAF-HM214	BAFF/TNFSF13B/CD257	Human	no	N-monomeric hFc	Ala134-Leu285
BAF-CM412B	BAFF/TNFSF13B/CD257 Trimer	Cynomolgus	yes	N-His-Avi-Flag	Thr141-Leu285
BAF-HM412B	BAFF/TNFSF13B/CD257 Trimer	Human	yes	N-His-Avi	Thr141-Leu285
BAF-CM412	BAFF/TNFSF13B/CD257 Trimer	Cynomolgus	no	N-His-Avi	Thr141-Leu285
BAF-HM112	BAFF/TNFSF13B/CD257 Trimer	Human	no	N-His-Flag	Thr141-Leu285
BAF-HM213	BAFF/TNFSF13B/CD257 Trimer	Human	no	N-monomeric hFc-Flag	Thr141-Leu285
ENP-HM402B	Biotinylated ENPP-1	Human	yes	C-His-Avi	Lys98-Asp925
BTL-HM401B	BTLA	Human	yes	C-His-Avi	Lys31-Ser150
BTL-CM101	BTLA	Cynomolgus	no	C-His	Lys31-Pro152
BTL-HM201	BTLA	Human	no	C-hFc	Lys31-Ser150
BTL-HM401	BTLA	Human	no	C-His-Avi	Lys31-Ser150
BTL-MM101	BTLA	Mouse	no	C-His	Glu30-Gly176
BTN-CM4A1B	BTN3A1/CD277	Cynomolgus	yes	C-His-Avi	Gln1-Trp219
BTN-HM4A3B	BTN3A1/CD277	Human	yes	C-His-Avi	Gln30-Gly254
BTN-CM4A1	BTN3A1/CD277	Cynomolgus	no	C-His-Avi	Gln1-Trp219
BTN-HM0A1	BTN3A1/CD277	Human	no	No Tag	Gln30-Gly254
BTN-HM2A3	BTN3A1/CD277	Human	no	C-hFc	Gln30-Gly254
BTN-HM1A1	BTN3A1/CD277	Human	no	C-His	Gln30-Gly254
C5A-HE15A	C5a	Human	no	N-His	Thr678-Arg751
CD4-HM401B	CD4/LEU3	Human	yes	C-His-Avi	Lys26-Trp390
CD4-HM401	CD4/LEU3	Human	no	C-His-Avi	Lys26-Trp390
CD4-HM204	CD4/LEU3	Human	no	C-hFc	Lys26-Trp390
CD4-RM101	CD4/LEU3	Rhesus macaque	no	C-His	Lys26-Trp390
PTP-HM404B	CD45/PTPRC	Human	yes	C-His-Avi	Gln26-Lys416
PTP-HM104	CD45/PTPRC	Human	no	C-His	Gln26-Lys577
PTP-HM204	CD45/PTPRC	Human	no	C-hFc	Gln26-Lys577
PTP-HM404	CD45/PTPRC	Human	no	C-His-Avi	Gln26-Ile416
PTP-MM201	CD45/PTPRC	Mouse	no	C-hFc	Gln26-Lys427
CD9-HM493B	CD93/C1q R1	Human	yes	C-His-Avi	Thr22-Lys580
CD9-HM193	CD93/C1q R1	Human	no	C-His	Thr22-Lys580
CD9-HM293	CD93/C1q R1	Human	no	C-hFc	Thr22-Lys580
CEA-DM101	CEACAM-1/CD66a	Canine	no	C-His	Gln35-Gly424

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
CEA-HM201	CEACAM-1/CD66a	Human	no	C-His	Gln35-Gly428
CEA-MM101	CEACAM-1/CD66a	Mouse	no	C-His	Glu35-Gly428
CEA-HM103	CEACAM-3	Human	no	C-His	Lys35-Gly155
CEA-HM203	CEACAM-3	Human	no	C-hFc	Lys35-Gly155
CAM-HM405B	CEACAM-5/CD66e	Human	yes	C-His-Avi	Lys35-Ala685
CAM-HM415B	CEACAM-5/CD66e	Human	yes	C-His-Avi	Lys35-Ala685
CAM-CM105	CEACAM-5/CD66e	Cynomolgus	no	C-His	Gln35-Gly685
CAM-HM405	CEACAM-5/CD66e	Human	no	C-His-Avi	Lys35-Ala685
CAM-HM105	CEACAM-5/CD66e	Human	no	C-His	Lys35-Ala685
CAM-HM1D1	CEACAM-5/CD66e (145-322)	Human	no	C-His	Pro145-Pro322
CAM-HM1D2	CEACAM-5/CD66e (323-500)	Human	no	C-His	Pro323-Leu500
CAM-HM1D3	CEACAM-5/CD66e (501-685)	Human	no	C-His	Pro501-Ala685
CAM-HM406B	CEACAM-6/CD66c	Human	yes	C-His-Avi	Lys35-Gly320
CAM-CM106	CEACAM-6/CD66c	Cynomolgus	no	C-His	Gln35-Gly320
CAM-HM406	CEACAM-6/CD66c	Human	no	C-His-Avi	Lys35-Gly320
CEA-HM107	CEACAM-7	Human	no	C-His	Thr36-Ser242
CEA-HM207	CEACAM-7	Human	no	C-hFc	Thr36-Ser242
CAM-HM408B	CEACAM-8/CD66b	Human	yes	C-His-Avi	Gln35-Ser319
CEA-HM108	CEACAM-8/CD66b	Human	no	C-His	Gln35-Ser319
CC5-HM1C5	Complement C5	Human	no	C-His	Gln19-Cys1676
ENP-HM102	ENPP-1	Human	no	C-His	Lys98-Asp925
ENP-HM103	ENPP-1	Human	no	N-His	Lys98-Asp925
ENP-MM102	ENPP-1	Mouse	no	C-His	Lys80-Asp906
GAS-CM106	GAS6	Cynomolgus	no	C-His	Ala31-Ala637
GAS-HM116	GAS6	Human	no	C-His	Ala49-Ala678
GAS-HM206	GAS6	Human	no	C-hFc	Asp279-Ala678
GAS-MM106	GAS6	Mouse	no	C-His	Val28-Pro674
FSF-CM118	GITR Ligand/TNFSF18	Cynomolgus	no	C-His	Gln72-Ser199
FSF-MM218	GITR Ligand/TNFSF18	Mouse	no	N-hFc	Thr47-Ser173
FSF-HM418B	GITR Ligand/TNFSF18 Trimer	Human	yes	N-His-Flag	Gln50-Ser177
FSF-HM418	GITR Ligand/TNFSF18 Trimer	Human	no	N-His-Flag	Gln50-Ser177
FSF-HM218	GITR Ligand/TNFSF18 Trimer	Human	no	N-monomeric hFc	Gln50-Ser177
GTR-HM401B	GITR/TNFRSF18	Human	yes	C-His-Avi	Gln26-Glu161
GTR-CM101	GITR/TNFRSF18	Cynomolgus	no	C-His	Gln20-Pro156
GTR-HM101	GITR/TNFRSF18	Human	no	C-His	Gln26-Glu161
GTR-HM201	GITR/TNFRSF18	Human	no	C-hFc	Gln26-Glu161
GTR-MM101	GITR/TNFRSF18	Mouse	no	C-His	Ser22-His153
IGF-HM41RB	IGF1R/CD221	Human	yes	C-His-Avi	Glu31-Asn932
IGF-CM41R	IGF1R/CD221	Cynomolgus	no	C-His	Glu31-Asn908
IGF-HM41R	IGF1R/CD221	Human	no	C-His-Avi	Glu31-Asn932
IGF-MM41R	IGF1R/CD221	Mouse	no	C-His	Glu31-His936
MIC-HM40AB	MICA	Human	yes	C-His-Avi	Glu24-Gln308

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
MIC-CM10A	MICA	Cynomolgus	no	C-His	Glu1-Trp284
MIC-HM20A	MICA	Human	no	C-hFc	Glu24-Gln308
MIC-HM40A	MICA	Human	no	C-His-Avi	Glu24-Gln308
MIC-HM3AD	MICA alpha 3	Human	no	N-mFc	Arg105-Ser200
NEC-HM404B	Nectin-4	Human	yes	C-His-Avi	Gly32-Val351
NEC-CM104	Nectin-4	Cynomolgus	no	C-His	Gly32-Val351
NEC-HM204	Nectin-4	Human	no	C-hFc	Gly32-Ser349
NEC-HM404	Nectin-4	Human	no	C-His-Avi	Gly32-Val351
NEC-MM104	Nectin-4	Mouse	no	C-His	Gly31-Ser347
NEC-HM414B	Nectin-4 IgV Domain	Human	yes	C-His-Avi	Gly32-Leu146
NEC-HM414	Nectin-4 IgV Domain	Human	no	C-His-Avi	Gly32-Leu146
PCS-CM190	PCSK9	Cynomolgus	no	C-His	Glu151-Gln811
PCS-HM190	PCSK9	Human	no	C-His	Gln31-Gln692
PCS-MM190	PCSK9	Mouse	no	C-His	Gln35-Gln694
SIG-CM110B	Siglec-10	Cynomolgus	yes	C-His	Thr17-Asn552
SIG-CM410B	Siglec-10	Cynomolgus	yes	C-His-Avi	Thr17-Asn552
SIG-HM410B	Siglec-10	Human	yes	C-His-Avi	Met17-Thr546
SIG-HM510B	Siglec-10	Human	yes	C-hFc-Avi	Met17-Thr546
SIG-CM110	Siglec-10	Cynomolgus	no	C-His	Thr17-Asn552
SIG-HM510	Siglec-10	Human	no	C-hFc-Avi	Met17-Thr546
SIG-HM210	Siglec-10	Human	no	C-His	Met17-Thr546
SIG-HM411B	Siglec-10 (R119A)	Human	yes	C-His-Avi	Met17-Thr546
SIG-HM411	Siglec-10 (R119A)	Human	no	C-His-Avi	Met17-Thr546
FSF-MM415B	TNFSF15	Mouse	yes	N-His-Avi	Ala61-Leu252
FSF-CM115	TNFSF15	Cynomolgus/Rhesus macaque	no	N-His	Leu72-Leu251
FSF-CM215	TNFSF15	Cynomolgus/Rhesus macaque	no	N-monomeric Fc	Leu72-Leu251
FSF-HM215	TNFSF15	Human	no	N-monomeric Fc	Leu72-Leu251
FSF-HM115	TNFSF15	Human	no	N-His	Leu72-Leu251
FSF-MM215	TNFSF15	Mouse	no	N-hFc	Ala61-Leu252
FSF-MM415	TNFSF15	Mouse	no	N-His-Avi	Ala61-Leu252
FSF-HM415	TNFSF15 trimer	Human	no	N-His-Flag	Asp91-Leu251
VEGF-HM4R1B	VEGF R1/FLT-1	Human	yes	C-His-Avi	Ser27-Asn756
VEGF-HM4R1	VEGF R1/FLT-1	Human	no	C-His-Avi	Ser27-Asn756
VEGF-HM3R2B	VEGF R2/KDR	Human	yes	C-mFc	Ala20-Glu764
VEGF-HM4R2B	VEGF R2/KDR	Human	yes	C-His-Avi	Ala20-Glu764
VEGF-HM4R2	VEGF R2/KDR	Human	no	C-His-Avi	Ala20-Glu764
VEGF-HM3R2	VEGF R2/KDR	Human	no	C-mFc	Ala20-Glu764
VEGF-MM1R2	VEGF R2/KDR	Mouse	no	C-His	Ala20-Glu762
VEGF-CM1R2	VEGF R2/KDR	Rhesus macaque	no	C-His	Ala20-Glu764
VEGF-HM4R3B	VEGF R3/FLT4	Human	yes	C-His-Avi	Tyr25-Ile776

Fc Receptors

Fc receptors (FcR) are receptors for immunoglobulin Ig, which can cause specific cellular immune responses by binding to specific regions of the Ig's Fc portion, acting as a bridge between humoral and cellular immunity in the body. The genetic polymorphism of FcR allows it to induce various intracellular biological effects, which are closely related to the occurrence and development of various immune-related diseases, such as autoimmune diseases SLE and RA. Fc receptor proteins are one of the most important protein families in the immune system, mediating antibody-dependent ADCP, ADCC, and CDC effects, playing a key role in immune activation and antibody function.

The most widely used currently are IgG receptors, including FcRn and FcγR. FcγR can be divided into three types: FcγRI, FcγRII, and FcγRIII. FcγRI has a high affinity (10⁻⁹M) with IgG, mainly expressed in mononuclear macrophages. FcγRII and FcγRIII have a low affinity (10⁻⁶M) with IgG and are widely distributed. FcγRII is divided into three types according to the structure of the cytoplasmic region: FcγRIIa, FcγRIIb, and FcγRIIc, which exist in B cells, macrophages, polymorphonuclear cells, platelets, and monocytes, and FcγRIIb is the only inhibitory receptor. FcγRIII is found in granulocytes, NK cells, macrophages, and activated monocytes. The binding of FcγR with antibodies can activate immune cells and produce internalization, phagocytosis, ADCC, etc.

FcRn can bind to IgG in acidic vesicles (pH < 7.0) to protect large antibody molecules from destruction; then, it releases large antibody molecules in a blood environment with a pH of 7.4, thus extending the half-life of the antibody, which plays an important role in the efficacy of the antibody.

Product Features:

- > 95% Purity by Bis-Tris PAGE
- HEK293 Mammalian Expression
- < 1EU/μg endotoxin by LAL method

Fc Receptor Proteins Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
CD3-HM123	CD23/Fc epsilon RII	Human	no	N-His	Asp48-Ser321
CDA-CM132	Fc gamma RIIA/CD32a	Cynomolgus	no	C-His	Gln28-Pro208
CDA-HM416B	Fc gamma RIIIA/CD16a (F176)	Human	yes	C-His-Avi	Gly17-Gln208(F176)
CDA-HM416	Fc gamma RIIIA/CD16a (F176)	Human	no	C-His-Avi	Gly17-Gln208(F176)
CDA-HM432	Fc gamma RIIA/CD32a (H167)	Human	no	C-His-Avi	Ala36-Ile218(H167)
CDB-HM401	Fc gamma RIIB/CD32b	Human	no	C-His-Avi	Ala46-Pro217
CDB-CM101	Fc gamma RIIB	Cynomolgus	no	C-His	Ala46-Pro224
CDA-HM432B	Fc gamma RIIA/CD32a (H167)	Human	yes	C-His-Avi	Ala36-Ile218(H167)
CDB-HM401B	Fc gamma RIIB/CD32b	Human	yes	C-His-Avi	Ala46-Pro217
CDB-MM101	Fc gamma RIIB/CD32b	Mouse	no	C-His	Thr40-Arg217
FCR-HM42A	Fc gamma RIIA/CD32a (R167)	Human	no	C-His-Avi	Ala36-Ile218(R167)
FCR-HM42BB	Fc gamma RIIB/CD16b (NA2)	Human	yes	C-His-Avi	Gly17-Ser200(NA2)
FCR-HM42B	Fc gamma RIIB/CD16b (NA2)	Human	no	C-His-Avi	Gly17-Ser200(NA2)
FCR-HM42AB	Fc gamma RIIA/CD32a (R167)	Human	yes	C-His-Avi	Ala36-Ile218(R167)
FCR-HM43AB	Fc gamma RIIIA/CD16a (V176)	Human	yes	C-His-Avi	Gly17-Gln208(V176)
FCR-HM43A	Fc gamma RIIIA/CD16a (V176)	Human	no	C-His-Avi	Gly17-Gln208(V176)
FCR-MM162	Fc gamma RIV/CD16-2	Mouse	no	C-His	Gly21-Gln203
FER-HM101	Fc epsilon RI alpha/FCER1a	Human	no	C-His	Val26-Gln205
FER-HM201	Fc epsilon RI alpha/FCER1a	Human	no	C-hFc	Val26-Gln205
FER-MM201	Fc Epsilon RI alpha/FCER1a	Mouse	no	C-hFc	Ala24-Gln204
FGR-MM1R3	Fc gamma RIIB/CD16	Mouse	no	C-His	Leu32-Thr215
FGR-CM1R3	Fc gamma RIIB/CD16	Cynomolgus	no	C-His	Gly17-Gln208
FRI-HM464	Fc gamma RI/CD64	Human	no	C-His-Avi	Gln16-Pro288
FRI-HM464B	Fc gamma RI/CD64	Human	yes	C-His-Avi	Gln16-Pro288
FRI-MM164	Fc gamma RI/CD64	Mouse	no	C-His	Glu25-Pro297
FRN-CM101	FcRn	Cynomolgus/ Rhesus macaque	no	C-His	Ala24-Ser297(FCGRT) & Ile21-Met119(B2M)
FRN-HM101	FcRn	Human	no	C-His	Ala24-Ser297(FCGRT) & Ile21-Met119(B2M)
FRN-MM101	FcRn	Mouse	no	C-His	Ser22-Ser297(FCGRT) & Ile21-Met119(B2M)
IGG-HM004	IgG4 Fc	Human	no	No Tag	Glu99-Gly326
IGG-HM001	IgG1 Fc	Human	no	No Tag	Asp104-Lys330
MFC-MM001	IgG1 Fc	Mouse	no	No Tag	Val98-Lys324
FCR-HM11B	Fc gamma RIIB/CD16b (NA1)	Human	no	C-His	Gly17-Ser200(NA1)
FRN-CM401B	FcRn	Cynomolgus/ Rhesus macaque	yes	C-His-Avi	Ala24-Ser297(FCGRT) & Ile21-Met119(B2M)
IGG-RM001	IgG	Rabbit	no	No Tag	Ser101-Lys323(T185A, N284S)
FCR-HM31D	Fc gamma RIIIA/CD16a (V176) Domain 2	Human	no	C-mFc	Gly107-Thr189
FRN-HM401B	FcRn	Human	yes	C-His-Avi	Ala24-Ser297(FCGRT) & Ile21-Met119(B2M)
FRN-MM401B	FcRn	Mouse	yes	C-His-Avi	Ser22-Ser297(FCGRT) & Ile21-Met119(B2M)

Biotinylated Proteins

After obtaining antibodies, it is necessary to screen and optimize the acquired antibodies. Proteins labeled with biotin have higher sensitivity and specificity, which can be used not only for various detection analyses but also for immune capture. They have unique advantages in analyses like ELISA, SPR, flow cytometry, and biopanning. KACTUS offers both site-specific and non-site-specific biotinylated proteins for customers to conduct antibody screening tests.

Product Features:

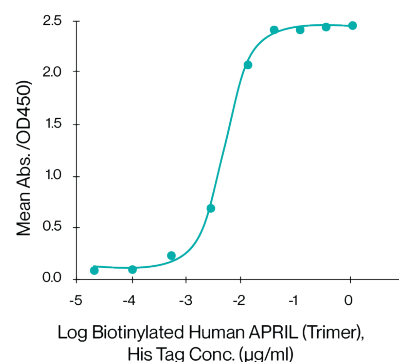
- < 1EU / μg by the LAL method
- > 95% purity by Tris-Bis PAGE
- > 95% purity by HPLC
- HEK293 mammalian expression

Site-specific biotinylation:

Site-specific biotinylated proteins utilize the principle that the lysine residue on the Avi tag can be modified with biotin by the biotin ligase BirA, enabling precise control of biotin modification. Moreover, when the protein is fixed to the surface of the affinity-coated bead, it has directional consistency and is widely used in various detection analyses.

(Figure right) Verified by ELISA, site-specific biotin-modified Human APRIL (Trimer) exhibit good binding activity with its ligand.

Biotinylated Human APRIL (Trimer), His Tag ELISA
0.5 μg Human BCMA, hFc Tag Per Well

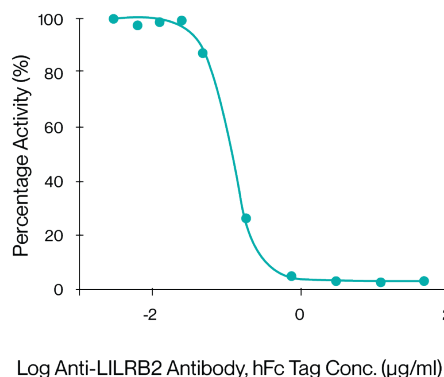


Non-site-specific biotinylation:

Non-site-specific biotinylated recombinant proteins are produced by chemical labeling, where the free amino groups or lysine residues of the protein can bind with biotin. This method may have higher sensitivity as multiple biotins can be labeled on each protein molecule.

(Figure right) Verified by ELISA, non-site-specific biotinylated labeled HLA-G tetramer can be applied in blocking analysis experiments related to corresponding antibodies.

Inhibition of Human LILRB2 and HLA-G Binding
0.2 μg Human LILRB2, mFc Tag Per Well



Biotinylated Proteins Product List:

Catalog #	Protein	Species	Tag	Exact Sequence
BBL-HM241B	4-1BB Ligand/TNFSF9 Trimer	Human	N-monomeric hFc	Arg71-Glu254
BB4-HM441B	4-1BB/TNFRSF9	Human	C-His-Avi	Leu24-Gln186
BB4-HM541B	4-1BB/TNFRSF9	Human	C-hFc-Avi	Leu24-Gln186
APR-HM410B	APRIL/TNFSF13 Trimer	Human	N-His-Avi-Flag	Lys112-Leu250
APR-HM110B	APRIL/TNFSF13 Trimer	Human	N-His-Flag	Lys112-Leu250
BH7-HM473B	B7-H3	Human	C-His-Avi	Leu29-Pro245
BH7-HM43BB	B7-H3 (4lg)/B7-H3b	Human	C-His-Avi	Gly27-Thr461
GDF-HE415B	Biotinylated GDF15	Human	N-His-Avi	Ala197-Ile308
CLD-HE1822B	Claudin 18.2	Human		Met1-Val261
CTL-HM401B	CTLA-4/CD152	Human	C-His-Avi	Lys36-Asp161
DDR-HM1R1	DDR1	Human	C-His	Asp21-Ala417
DDR-MM1R1	DDR1	Mouse	C-His	Asp22-Ala415
DKK-HM401B	DKK1	Human	C-His-Avi	Thr32-His266
DKK-HM51CB	DKK1 C terminal Domain	Human	C-hFc-Avi	Met178-His266
DKK-HM50NB	DKK1 N terminal Domain	Human	C-hFc-Avi	Thr32-Asp142
DLL-HM103B	DLL3	Human	N-His	Ala27-Arg490
DLL-HM4D1B	DLL3 Domain (311-479)	Human	C-His-Avi	Val311-Ala479
CAM-HM4EPB	EpCAM/TROP1	Human	C-His-Avi	Gln24-Lys265
FGL-HM411B	FGL1	Human	N-His-Avi	Asp64-Asn305
FGL-HM211B	FGL1	Human	N-hFc	Asp64-Asn305
FOL-HM4R1B	FOLR1	Human	C-His-Avi	Arg25-Met233
GPR-HM05PB	GPRC5D	Human		Met1-Val345
GCC-HM401B	GUCY2C/Guanylyl cyclase C	Human	C-His-Avi	Ser24-Gln430
GCC-MM401B	GUCY2C/Guanylyl cyclase C	Mouse	C-His-Avi	Val20-Met433
ILA-HM418B	IL-17A/CTLA-8	Human	C-His-Avi	Gly24-Ala155
ILA-MM417B	IL-17A/CTLA-8	Mouse	C-His-Avi	Ala26-Ala158
CD5-HM425B	IL-2 R alpha/CD25	Human	C-His-Avi	Glu22-Cys213
IL2-MM423B	IL-23A	Mouse	C-His-Avi	Val22-Ala196
LIL-HM4B2B	LILRB2/CD85d/ILT4	Human	C-His-Avi	Gln22-His458
LRR-CM415B	LRRIC15/LIB	Cynomolgus/Rhesus macaque	C-His-Avi	Tyr22-Gly538
NKG-HM42DB	NKG2D/CD314	Human	N-His-Avi	Phe78-Val216
OX4-HM440B	OX40/TNFRSF4/CD134	Human	C-His-Avi	Leu29-Ala216
OX4-HM240B	OX40/TNFRSF4/CD134	Human	C-hFc	Leu29-Ala216
OX4-MM440B	OX40/TNFRSF4/CD134	Mouse	C-His-Avi	Val20-Pro211
TIM-HM431B	Tim-3/HAVCR2	Human	C-His-Avi	Ser22-Arg200
TNF-HM40AB	TNF alpha	Human	C-His-Avi	Val77-Leu233
TSP-CM101B	TSLP	Cynomolgus	C-His	Tyr29-Gln159
TSP-HM401B	TSLP	Human	C-His-Avi	Tyr29-Gln159
TSP-HM402B	TSLP (R127A, R130A)	Human	C-His-Avi	Tyr29-Gln159(R127A,R130A)

FGFR Family Proteins

FGFR (Fibroblast Growth Factor Receptors), also known as fibroblast growth factor receptors, generally include four types: FGFR1-4 (also known as CD331-334). FGFR is a branch of the tyrosine kinase receptor family and is a type I transmembrane protein, including extracellular, transmembrane, and cytoplasmic regions, and usually functions in a dimer form. Among them, the extracellular structural domain contains three Ig-like regions D1 (IgI), D2 (IgII), D3 (IgIII), where D1 and the Acidic box form a self-inhibitory region; D2 and D3 are responsible for ligand binding (D2 binds to cell surface heparan sulfate, D3 has two forms IIIb and IIIc due to alternative splicing, and only the IIIc subtype is found in FGFR4 so far). Based on the number of Ig-like structural domains, FGFR can be divided into two forms, one is the alpha type, containing IgI, IgII, IgIII regions; the other is the beta type, containing only IgII and IgIII.

The ligand for FGFR is FGF, and 18 types of human FGF have been discovered so far. Except for FGF19, FGF21, FGF23 which are endocrine, the rest are produced paracrinally, among which FGF7 can only bind with IIIb type of FGFR2. The binding of FGFR and FGF mediates the activation and transmission of signaling pathways such as RAS-RAF-MAPK, PI3K-AKT, JAK-STAT, and PLC γ , participating in important physiological processes such as cell growth, differentiation, migration, angiogenesis, regulation of organ development, and wound healing. FGFR gene mutations are commonly widespread in solid tumors such as lung cancer, liver cancer, intrahepatic cholangiocarcinoma, breast cancer, gastric cancer, uterine cancer, and bladder cancer, and the types and frequencies of FGFR mutations vary in different cancer types.

KACTUS has conducted an in-depth analysis of the structural differences of the FGFR family proteins and successfully prepared various types of recombinant FGFR proteins, covering alpha and beta subtypes, as well as different forms such as IIIb and IIIc, aiding in the differentiated research of FGFR targeted drugs.

FGFR Proteins Product List:

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
KLB-HM101	Beta Klotho	Human	no	C-His	Met30-Thr983
FGF-HE001	FGF basic	Human	no	No Tag	Pro143-Ser288
FGF-HE002	FGF basic (154aa)	Human	no	No Tag	Ala135-Ser288
KGF-HE101B	FGF-7/KGF	Human	yes	N-His	Cys32-Thr194
KGF-HE101	FGF-7/KGF	Human	no	N-His	Cys32-Thr194
FGF-HE010	FGF10	Human	no	No Tag	Gln38-Ser208
FGF-HM621B	FGF21	Human	yes	N-mFc-Avi	His29-Ser209
FGF-CM121	FGF21	Cynomolgus	no	C-His	His29-Ser209
FGF-HM12T	FGF21	Hamster	no	C-His	Arg29-Ser209
FGF-HM121	FGF21	Human	no	N-His	His29-Ser209
FGF-HM621	FGF21	Human	no	N-mFc-Avi	His29-Ser209
FGF-MM121	FGF21	Mouse	no	N-His	His29-Ser210
FGF-HM4RAB	FGFR1 alpha (IIIc)	Human	yes	C-His-Avi	Arg22-Glu374
FGF-HM4RA	FGFR1 alpha (IIIc)	Human	no	C-His-Avi	Arg22-Glu374
FGF-HM41CB	FGFR1 beta (IIIc)	Human	yes	C-His-Avi	Lys158-Thr355
FGF-HM41C	FGFR1 beta (IIIc)	Human	no	C-His-Avi	Lys158-Thr355
FGF-HM4ABB	FGFR2 alpha (IIIb)	Human	yes	C-His-Avi	Arg22-Glu378

Catalog #	Protein	Species	Biotinylated	Tag	Exact Sequence
FGF-CM1BB	FGFR2 alpha (IIIb)	Cynomolgus	no	C-His	Pro154-Lys368
FGF-HM2RA	FGFR2 alpha (IIIb)	Human	no	C-hFc	Arg22-Glu378
FGR-HM1BD	FGFR2 alpha (IIIb)	Human	no	C-His	Arg22-Glu378
FGF-HM4CDB	FGFR2 alpha (IIIc)	Human	yes	C-His-Avi	Arg22-Glu377
FGR-HM2CD	FGFR2 alpha (IIIc)	Human	no	C-His	Arg22-Glu377
FGR-HM4BBB	FGFR2 beta (IIIb)	Human	yes	C-His-Avi	Arg152-Glu378
FGR-HM1BB	FGFR2 beta (IIIb)	Human	no	C-His	Arg152-Glu378
FGR-HM2BB	FGFR2 beta (IIIb)	Human	no	C-hFc	Arg152-Glu378
FGF-HM12D	FGFR2 beta (IIIb)	Human	no	C-His	Pro154-Leu358
FGF-MM1BB	FGFR2 beta (IIIb)	Mouse	no	C-His	Pro39-Pro263
FGF-HM4BDB	FGFR2 beta (IIIb) Domain	Human	yes	C-Avi	Pro253-Glu378
FGF-HM0BD	FGFR2 beta (IIIb) Domain	Human	no	C-Avi	Pro253-Glu378
FGF-HM2BD	FGFR2 beta (IIIb) Domain	Human	no	C-hFc	Pro253-Glu378
FGR-HM4BCB	FGFR2 beta (IIIc)	Human	yes	C-His-Avi	Arg152-Glu377
FGR-HM1BC	FGFR2 beta (IIIc)	Human	no	C-His	Arg152-Glu377
FGF-HM43BB	FGFR3 alpha (IIIb)	Human	yes	C-His-Avi	Glu23-Gly377
FGF-HM43B	FGFR3 alpha (IIIb)	Human	no	C-His-Avi	Glu23-Gly377
FGF-MM43B	FGFR3 alpha (IIIb)	Mouse	no	C-His	Pro22-Val349
FGF-HM43CB	FGFR3 alpha (IIIc)	Human	yes	C-His-Avi	Glu23-Gly375
FGF-HM43C	FGFR3 alpha (IIIc)	Human	no	C-His-Avi	Glu23-Gly375
FGF-HM4BBB	FGFR3 beta (IIIb)	Human	yes	C-His-Avi	Asp127-Gly377
FGF-HM4BB	FGFR3 beta (IIIb)	Human	no	C-His-Avi	Asp127-Gly377
FGF-HM4BCB	FGFR3 beta (IIIc)	Human	yes	C-His-Avi	Asp127-Gly377
FGF-HM4BC	FGFR3 beta (IIIc)	Human	no	C-His-Avi	Asp127-Gly375
FGF-HM4R4B	FGFR4	Human	yes	C-His-Avi	Leu22-Asp369
FGF-HM2R4	FGFR4	Human	no	C-hFc	Leu22-Asp369
FGF-HM4R4	FGFR4	Human	no	C-His-Avi	Leu22-Asp369
FGF-CM1R4	FGFR4	Rhesus macaque	no	C-His	Leu22-Asp369
FGF-HM4RBB	FGFR4 beta	Human	yes	C-His-Avi	Pro152-Asp369
FGF-HM4RB	FGFR4 beta	Human	no	C-His-Avi	Pro152-Asp369

