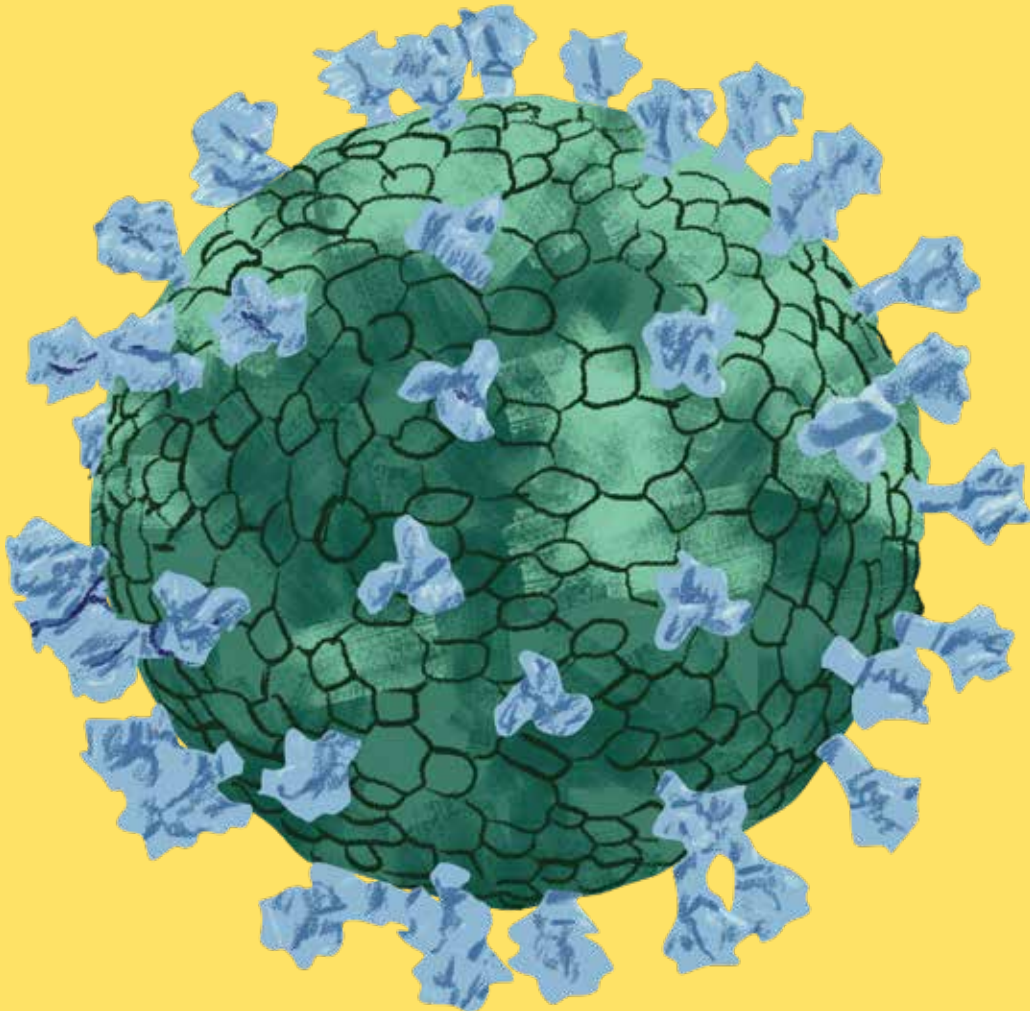


VLP & Nanodisc Displayed Antigens

Multi-pass transmembrane proteins displayed
on virus-like particles and nanodiscs



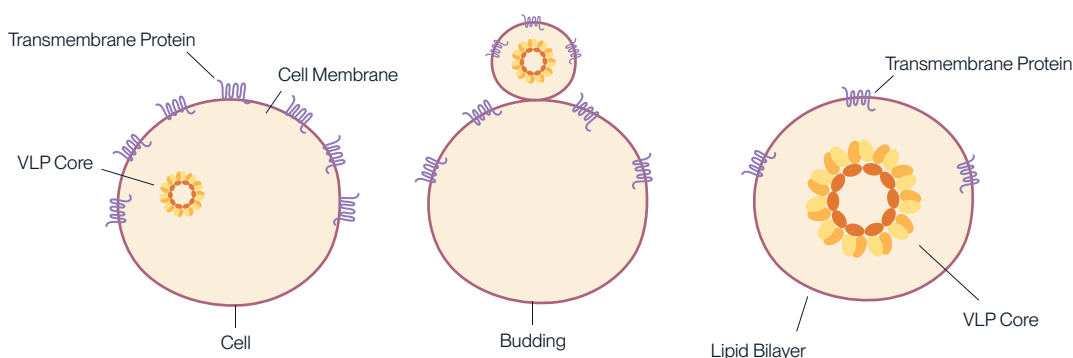
Multipass-Transmembrane Proteins

Multipass transmembrane proteins are a group of proteins with essential roles in physiological process and are also important targets for drug discovery and development.

Producing soluble recombinant forms of these proteins, however, has long been a significant challenge, impeding the progress of new drug development. To fulfill this unmet needs, KACTUS has established a robust VLP and Nanodisc technology platform that enables the soluble expression of multipass transmembrane proteins. Our platform technology preserves the native structure and conformation of the proteins while maintaining robust biological activity, supporting academic and industrial drug development against challenging transmembrane proteins.

VLP-Displayed Multi-Pass Transmembrane Proteins

Virus-like particles (VLPs) are non-infectious nanoscale structures that closely mimic the organization and shape of native viruses but lack viral genetic material. They comprise self-assembled viral structural proteins and are highly immunogenic due to their repetitive, multivalent surface. Therefore, VLPs are now increasingly applied as a powerful display platform for membrane proteins, specifically the multipass transmembrane proteins, empowering the antibody discovery for challenging membrane protein targets.



The mechanism of displaying transmembrane proteins on VLPs.

We have successfully developed a series of full-length, multi-pass transmembrane proteins displayed on VLPs, including Claudin18.2, Claudin 6, GPRC5D, STEAP1, CD20, and more. Our VLP proteins have undergone rigorous biological activity validation, with high sensitivity, specificity, and stability.

VLP | Product Advantages



Full-length expression



Boosted Immunogenicity



Avi-based Biotinylation



Bioactivity Validation
via ELISA, SPR, etc.

VLP | Product Applications



Animal Immunization



Antibody Screening



ELISA, SPR Analysis

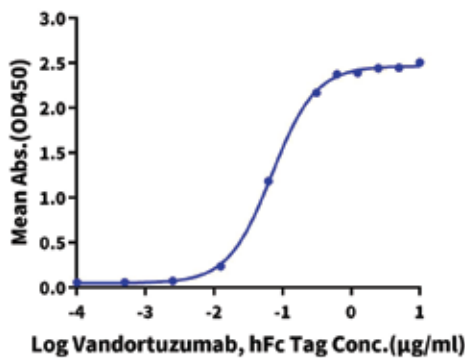


In vitro PK/PD study

VLP | Product Performance Validation

Human STEAP1 VLP ELISA

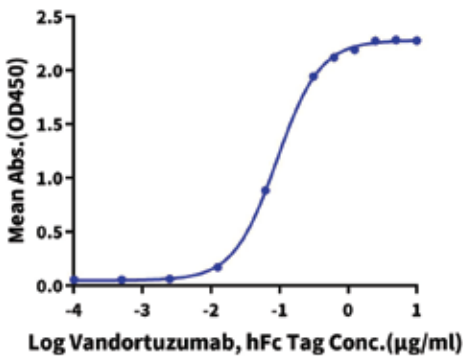
0.5µg Human STEAP1 VLP Per Well



Immobilized Human STEAP1 VLP at 5 µg/ml (100µl/well) on the plate. Dose response curve for Vandortuzumab with the EC50 of 69.6ng/ml determined by ELISA. Catalog No. STP-HM01V

Biotinylated Human STEAP1 VLP ELISA

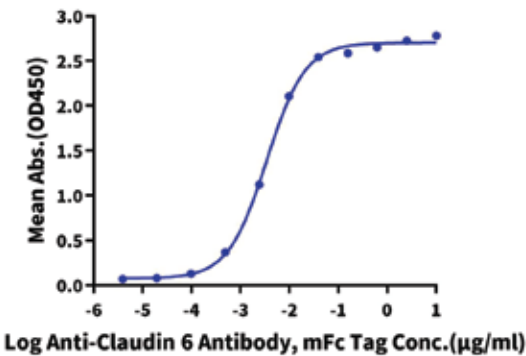
0.5µg Biotinylated Human STEAP1 VLP Per Well



Immobilized Biotinylated Human STEAP1 VLP at 5µg/ml (100µl/well) on the streptavidin precoated plate (5µg/ml). Dose response curve for Vandortuzumab, hFc Tag with the EC50 of 91.2ng/ml determined by ELISA. Catalog No. STP-HM00VB

Human Claudin 6 VLP ELISA

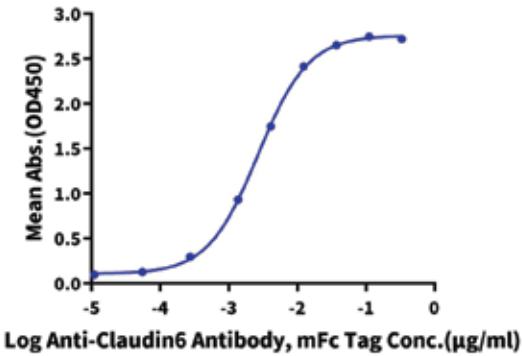
0.5µg Human Claudin 6 VLP Per Well



Claudin-6 is a multipass transmembrane protein in the Claudin family. Claudin-6 is expressed by epithelial cells where it participates in tissue development and the maintenance of tight junction integrity. Human Claudin-6 shares 88% and 86% amino acid sequence identity with mouse and rat Claudin-6, respectively. Catalog No. CLD-HM006

Biotinylated Human Claudin 6 VLP ELISA

0.5µg Biotinylated Human Claudin 6 VLP Per Well

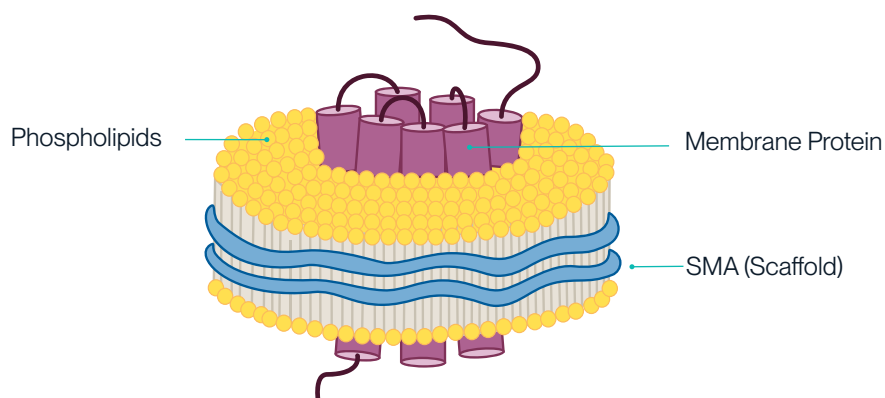


Immobilized Biotinylated Human Claudin 6 VLP at 5µg/ml (100µl/well) on the streptavidin precoated plate (5µg/ml). Dose response curve for Anti-Claudin6 Antibody, mFc Tag with the EC50 of 6.5ng/ml determined by ELISA. Catalog No. CLD-HM006B

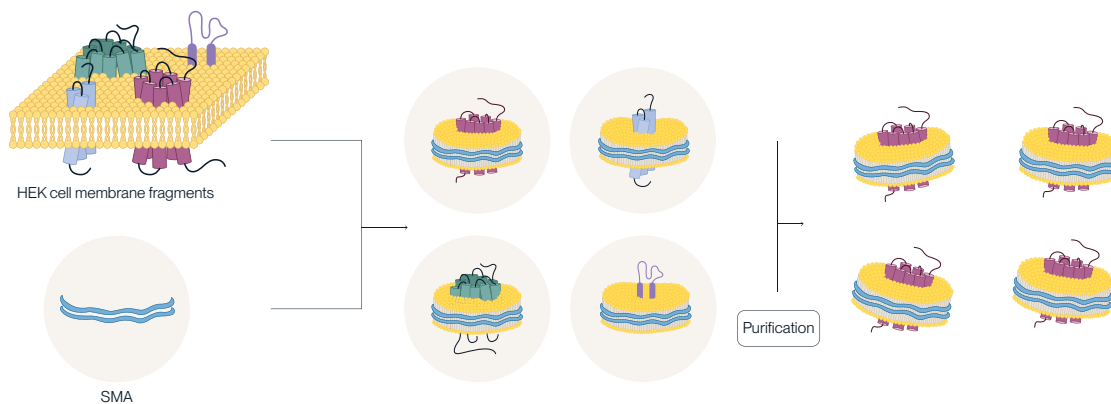
Nanodisc-Displayed Multi-Pass Transmembrane Proteins

Nanodiscs are membrane-mimetic structures composed of a phospholipid bilayer and membrane scaffold proteins.

They serve as important tools for stably displaying multi-pass transmembrane proteins with native conformation and protein activity. KACTUS leverages a detergent-free production process to produce SMA-based nanodiscs to maximally maintain the native structure and conformation of the full-length, multi-pass transmembrane proteins in soluble format, allowing wide applications in drug screening, analytical assay development and testing.



Structure of the nanodisc displaying multi-pass transmembrane proteins



Process of SMA-based nanodisc production

Nanodisc | Product Advantages



Full-length expression



Better Purity, More Precise
Protein Quantification



Detergent-Free Process



Bioactivity Validation via
ELISA, SPR, & BLI etc.

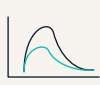
Nanodisc | Product Applications



Antibody Panning



Antibody Screening

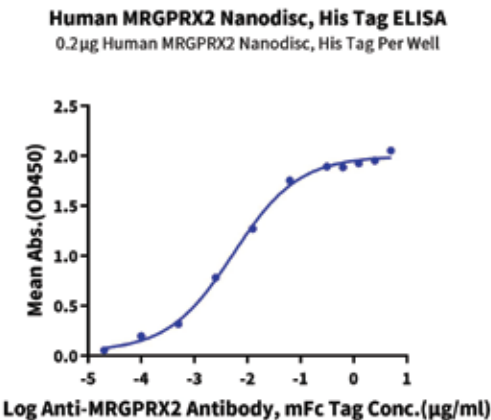


ELISA, SPR Analysis

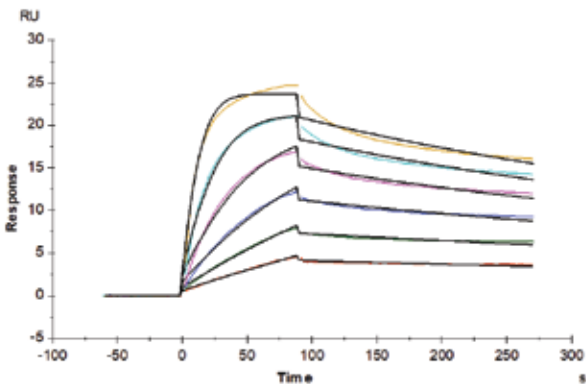


In vitro PK/PD study

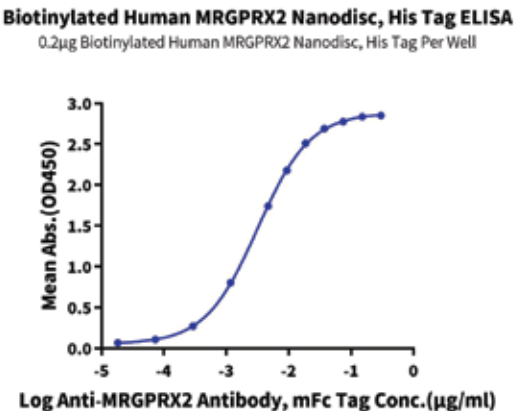
Nanodisc | Product Performance Validation



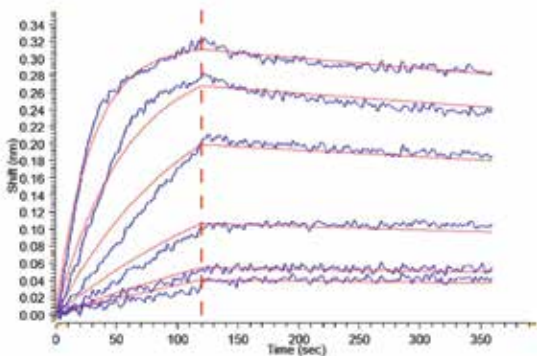
Immobilized Human MRGPRX2 Nanodisc, His Tag at 2µg/ml (100µl/well) on the plate. Dose response curve for Anti-MRGPRX2 Antibody, mFc Tag with the EC50 of 11.1ng/ml determined by ELISA.
Catalog No.MR2-HM1N118



Human MRGPRX2 Nanodisc, His Tag captured on CM5 Chip via Anti-His Antibody can bind Anti-MRGPRX2 Antibody, mFc Tag with an affinity constant of 0.16 nM as determined in SPR assay (Biacore T200).
Catalog No.MR2-HM1N118



Immobilized Biotinylated Human MRGPRX2 Nanodisc, His Tag at 2µg/ml (100µl/well) on the streptavidin precoated plate (5µg/ml). Dose response curve for Anti-MRGPRX2 Antibody, mFc Tag with the EC50 of 3.2ng/ml determined by ELISA
Catalog No. MR-HM10XN



Loaded Biotinylated Human MRGPRX2 Nanodisc, His Tag on Streptavidin-Biosensor can bind Anti-MRGPRX2 Antibody, mFc Tag with an affinity constant of 0.25 nM as determined in BLI assay.
Catalog No. MR2-HM10XN

Custom VLP & Nanodisc Services

KACTUS offers innovative solutions for studying membrane proteins by displaying multipass transmembrane proteins on **Virus-Like Particles (VLPs)** or **SMA-based nanodiscs**. Our platforms provide a stable and physiologically relevant environment for membrane proteins. Our membrane protein expression technology provides high-quality proteins for drug discovery, immunization, screening, and analytical assays. On top of our comprehensive catalog of full-length multipass transmembrane proteins, we offer custom transmembrane protein expression on VLPs or nanodiscs.

Service Highlights:



Full-length Expression



VLP or Nanodisc Display



Mammalian Cell
Expression System



Biotinylation or Fluorescence



8 Week Production

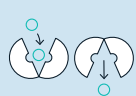


Bioactivity Analysis

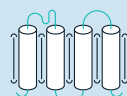
Areas of Expertise



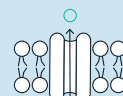
GPCRs



Solute Carriers



Tetraspanins



Ion Channels

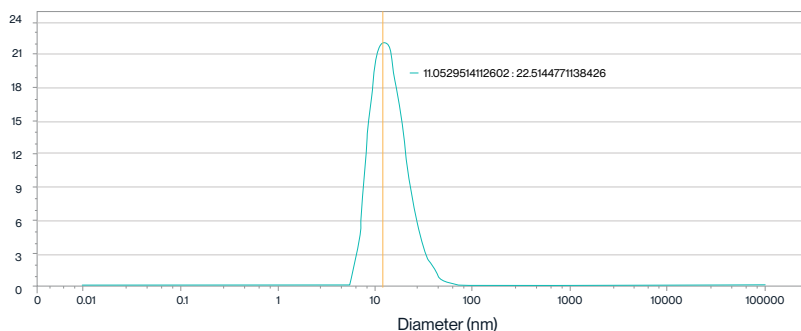
Case Study: Custom Production of Human Polycystin-2 (PKD2) Ion Channel

140kDa
115kDa
80kDa



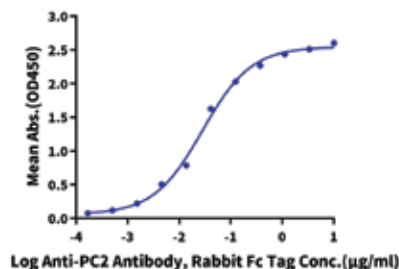
111.6kDa

Western Blot results of Human Polycystin-2 (PKD2), His tag nanodisc, with predicted MW of 111.6kDa



Dynamic Light Scattering (DLS) analysis showcasing the size of the nanodisc.

Human PC2 Nanodisc, His Tag ELISA
0.2µg Human PC2 Nanodisc, His Tag Per Well



Immobilized Human PC2 Nanodisc, His Tag at 2µg/ml (100µl/well) on the plate. Dose response curve for Anti-PC2 Antibody, Rabbit Fc Tag with the EC50 of 28.2ng/ml determined by ELISA.
Catalog No. PC-HM10N

Ordering Information

Cat. No.	Product Name	Sequence	Species	Expression System
A2R-HM00V	Human A2AR VLP	Met1-Ser412	Human	HEK293
APL-HM0P112	Human APLNR VLP	Met1-Asp380	Human	HEK293
C5R-HM00V	Human C5aR1 VLP	Met1-Val350	Human	HEK293
CNR-HM001	Human Cannabinoid receptor 1 VLP	Met1-Leu472	Human	HEK293
CCR-HM02B	Human CCR2b VLP	Met1-Leu360	Human	HEK293
CCR-HM08V	Human CCR8 VLP	Met1-Leu355	Human	HEK293
CD33-HM0P110	Human CD133 VLP	Met1-His865	Human	HEK293
CD1-HM09V	Human CD19 VLP	Met1-Arg556	Human	HEK293
CD2-HM123	Human CD20/MS4A1 VLP	Met1-Pro297	Human	HEK293
CD2-HM124V	Human CD24 VLP	Ser27-Gly59	Human	HEK293
CMR-HM00V	Human Chemerin-like receptor 1 VLP	Met1-Leu373	Human	HEK293
CLD-HE1822	Human Claudin 18.2 VLP	Met1-Val261	Human	HEK293
CLD-HM0P37	Human Claudin 18.2 VLP	Met1-Val261	Human	HEK293
CLD-HM104	Human Claudin 4 VLP	Met1-Val209	Human	HEK293
CLD-HM006	Human Claudin 6 VLP	Met1-Val220	Human	HEK293
CLD-HM009	Human Claudin 9 VLP	Met1-Val217	Human	HEK293
CXR-HM00V	Human CX3CR1 VLP	Met1-Leu355	Human	HEK293
CXC-HM1R5	Human CXCR5 VLP	Met1-Phe372	Human	HEK293
CXC-HM1R6	Human CXCR6 VLP	Met1-Leu342	Human	HEK293
EDA-HM0P111	Human EDNRA VLP	Met1-Asn427	Human	HEK293
GCR-HM00V	Human GCGR/Glucagon receptor VLP	Met1-Phe477	Human	HEK293
GPC-HE005	Human GPC3 VLP	Gly510-Asn554	Human	E.coli
GPR-HM046	Human GPR146 VLP	Met1-Ala333	Human	HEK293
GPR-HM020	Human GPR20 VLP	Met1-Ala358	Human	HEK293
GPR-HM00V	Human GPR75 VLP	Met1-Val540	Human	HEK293
GPR-HM05P	Human GPRC5D VLP	Met1-Val345	Human	HEK293
KV1-HM00V	Human Kv1.3 VLP	Met1-Val575	Human	HEK293
LGR-HM00V	Human LGR-5 VLP	Met1-Leu907	Human	HEK293
LPA-HM0P111	Human LPAR1/LPA receptor 1 VLP	Met1-Val364	Human	HEK293
MR2-HM00V	Human MRGPRX2 VLP	Met1-Val330	Human	HEK293
SLC-HM02V	Human NaPi2b/SLC34A2 VLP	Met1-Leu689	Human	HEK293
TCC-HM00V	Human NY-ESO-1 TCR&CD3 Complex VLP	NY-ESO-1 specific TCR (1G4c113), CD3ε&CD3γ, CD3ε&CD3δ, and CD3ζ dimers	Human	HEK293
PAR-HM01R	Human Proteinase-activated receptor 1/PAR-1 VLP	Met1-Thr425	Human	HEK293
STR-HM002	Human SSTR2 VLP	Met1-Ile369	Human	HEK293
STP-HM01V	Human STEAP1 VLP	Met1-Leu339	Human	HEK293
STP-HM02V	Human STEAP2 VLP	Met1-Met490	Human	HEK293
TSF-HM002	Human TM4SF1 VLP	Met1-Cys202	Human	HEK293
THR-HM00V	Human TSHR VLP	Met1-Leu764	Human	HEK293
CLD-HE1822B	Biotinylated Human Claudin 18.2 VLP	Met1-Val261	Human	HEK293
CCR-HM02BB	Biotinylated Human CCR2b VLP	Met1-Leu360	Human	HEK293
CD2-HM123B	Biotinylated Human CD20/MS4A1 VLP	Met1-Pro297	Human	HEK293
CCR-HM08VB	Biotinylated Human CCR8 VLP	Met1-Leu355	Human	HEK293
STP-HM00VB	Biotinylated Human STEAP1 VLP	Met1-Leu339	Human	HEK293
TCC-HM00VB	Biotinylated Human NY-ESO-1 TCR&CD3 Complex VLP	NY-ESO-1 specific TCR (1G4c113), CD3ε&CD3γ, CD3ε&CD3δ, and CD3ζ dimers	Human	HEK293
STP-HM02VB	Biotinylated Human STEAP2 VLP	Met1-Met490	Human	HEK293
GPR-HM05PB	Biotinylated Human GPRC5D VLP	Met1-Val345	Human	HEK293
CLD-HM006B	Biotinylated Human Claudin 6 VLP	Met1-Val220	Human	HEK293
SLC-HM0A4B	Biotinylated Human SLC2A4 VLP	Met1-Asp509	Human	HEK293
CD2-CM124V	Cynomolgus CD24 VLP	Ser26-Gly57	Cynomolgus	HEK293
CLD-CM006	Cynomolgus Claudin 6 VLP	Met1-Val220	Cynomolgus	HEK293
GPR-CM05P	Cynomolgus GPRC5D VLP	Met1-Cys300	Cynomolgus	HEK293
STP-CM00V	Cynomolgus STEAP1 VLP	Met1-Leu339	Cynomolgus	HEK293
CLD-MM006	Mouse Claudin 6 VLP	Met1-Val219	Mouse	HEK293
GPR-MM05P	Mouse GPRC5D VLP	Met1-Leu344	Mouse	HEK293
VLP-HM00C	VLP Control	/	/	HEK293
STP-HM0VC	VLP Control	/	/	HEK293
CON-HM00VB	Biotinylated VLP Control	/	/	HEK293
GPR-HM05CB	Biotinylated VLP Control	/	/	HEK293

Nanodisc

Cat. No.	Product Name	Sequence	Species	Tag	Expression System
A2R-HM1N1	Human A2AR Nanodisc	Met1-Ser412	Human	C-His	HEK293
CR4-HM1N122	Human CCR4 Nanodisc	Met1-Leu360	Human	C-His	HEK293
CCR-HM107	Human CCR7 Nanodisc	Met1-Pro378	Human	C-His	HEK293
CR8-HM1N29	Human CCR8 Nanodisc	Met1-Leu355	Human	C-His	HEK293
CLD4-HM1N161	Human Claudin 4 Nanodisc	Met1-Val209	Human	C-His	HEK293
CXR5-HM1N72	Human CXCR5 Nanodisc	Met1-Phe372	Human	C-His	HEK293
GLP-HM1N123	Human GLP-1R Nanodisc	Met1-Ser463	Human	C-His	HEK293
GPR-HM15P	Human GPRC5D Nanodisc	Met1-Val345	Human	C-His	HEK293
LGR-HM10N	Human LGR-4 Nanodisc	Met1-Asp951	Human	C-His	HEK293
MR2-HM1N118	Human MRGPRX2 Nanodisc	Met1-Val330	Human	C-His	HEK293
PC2-HM10N	Human PC2/Polycystin-2 Nanodisc	Met1-Val968	Human	C-His	HEK293
TSF-HM00N	Human TM4SF1 Nanodisc	Met1-Cys202	Human	N-His	HEK293
GLP-HM10NB	Biotinylated Human GLP-1R Nanodisc	Met1-Ser463	Human	C-His	HEK293
CD8-HM18NB	Biotinylated Human CD81 Nanodisc	Met1-Tyr236	Human	C-His	HEK293
CCR-HM19NB	Biotinylated Human CCR9 Nanodisc	Met1-Leu369	Human	C-His	HEK293
CXC-HM16NB	Biotinylated Human CXCR6 Nanodisc	Met1-Leu342	Human	C-His	HEK293
GPR-HM15NB	Biotinylated Human GPRC5D Nanodisc	Met1-Val345	Human	C-His	HEK293
CLD-HM10NB	Biotinylated Human Claudin 18.2 Nanodisc	Met1-Val261	Human	C-His	HEK293
CCR-HM16NB	Biotinylated Human CCR6 Nanodisc	Met1-Met374	Human	C-His	HEK293
CLD-HM14NB	Biotinylated Human Claudin 4 Nanodisc	Met1-Val209	Human	C-His	HEK293
CXR-HM17NB	Biotinylated Human CXCR7 Nanodisc	Met1-Lys362	Human	C-His	HEK293
STR-HM10N	Biotinylated Human SSTR2 Nanodisc	Met1-Ile369	Human	C-His	HEK293
KV1-HM10NB	Biotinylated Human Kv1.3 Nanodisc	Met1-Val575	Human	C-His	HEK293
EDA-HM10VB	Biotinylated Human EDNRA Nanodisc	Met1-Asn427	Human	C-His	HEK293
GIP-HM14RNB	Biotinylated Human GIPR Nanodisc	Met1-Cys466	Human	C-His	HEK293
CXC-HM1RNB	Biotinylated Human CXCR5 Nanodisc	Met1-Phe372	Human	C-His	HEK293
XCT-HM10NB	Biotinylated Human Cystine/glutamate transporter (SLC7A11) Nanodisc	Met1-Leu501	Human	C-His	HEK293
CLD-HM16NB	Biotinylated Human Claudin 6 Nanodisc	Met1-Val220	Human	C-His	HEK293
MR2-HM10XN	Biotinylated Human MRGPRX2 Nanodisc	Met1-Val330	Human	C-His	HEK293
CCR-HM17NB	Biotinylated Human CCR7 Nanodisc	Met1-Pro378	Human	C-His	HEK293
CXR-HM10NB	Biotinylated Human CX3CR1 Nanodisc	Met1-Leu355	Human	C-His	HEK293
SLC-HM1ANB	Biotinylated Human NaPi2b/SLC34A2 Nanodisc	Met1-Leu689	Human	C-His	HEK293
CCR-HM14NB	Biotinylated Human CCR4 Nanodisc	Met1-Leu360	Human	C-His	HEK293
CLD-HM1N1B	Biotinylated Human Claudin 1 Nanodisc	Met1-Val211	Human	C-His	HEK293
GPR-HM15NB	Biotinylated Human GPRC5D Nanodisc	Met1-Val345	Human	C-His	HEK293
CLD-HM10NB	Biotinylated Human Claudin 18.2 Nanodisc	Met1-Val261	Human	C-His	HEK293
CCR-HM16NB	Biotinylated Human CCR6 Nanodisc	Met1-Met374	Human	C-His	HEK293
CLD-HM13NB	Biotinylated Human Claudin 3 Nanodisc	Met1-Val220	Human	C-His	HEK293
CD1-HM13NB	Biotinylated Human CD133 Nanodisc	Met1-His865	Human	C-His	HEK293
KV1-HM10NB	Biotinylated Human Kv1.3 Nanodisc	Met1-Val575	Human	C-His	HEK293
EDA-HM10VB	Biotinylated Human EDNRA Nanodisc	Met1-Asn427	Human	C-His	HEK293
LAR-HM10NB	Biotinylated Human LPAR1 Nanodisc	Met1-Val364	Human	C-His	HEK293
STR-HM4N159B	Biotinylated Human SSTR2 Nanodisc	Met1-Ile369	Human	C-His-Avi	HEK293
CD2-DM12NB	Biotinylated Canine CD20/MS4A1 Nanodisc	Met1-Pro297	Canine	C-His	HEK293
CON-HM1NB	Biotinylated Nanodisc Control	/	/	C-His	HEK293

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Contact Information

Please contact support@kactusbio.us to request more information, speak to a sales representative, request a quote, or with help placing an order.



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