



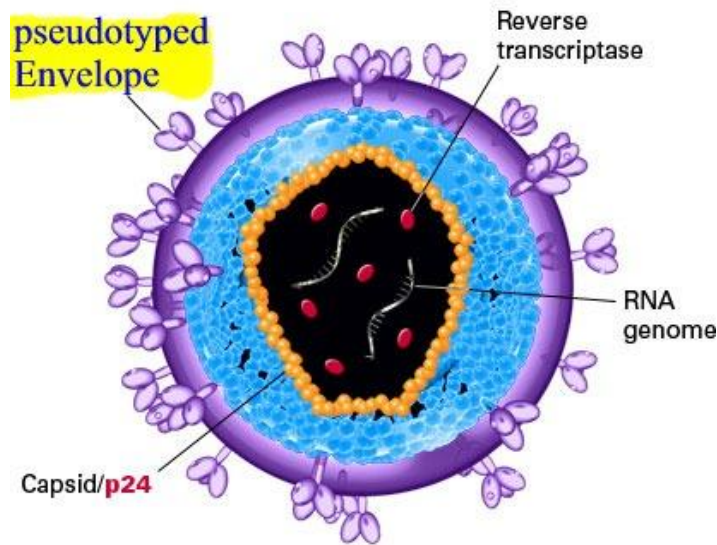
Virus Like Particle of COVID-19 Spike protein (S)

Catalog#	Product Name	Amounts
VLP001	COVID-19 S (6His) / (GFP) VLP	1x10 ⁸ VP/ml x 200ul
VLP002	COVID-19 S (6His) / (Luciferase) VLP	1x10 ⁸ VP/ml x 200ul

Storage: < -70 °C, avoid repeat freeze/thaw cycles. Stable for > 6 months.

What is Virus-Like Particles (VLP)?

A viral envelope is the outermost layer of the virus, consist of the glycoproteins. It serves to bind the receptor on the host's cell membrane. When desired, the virus can be enveloped with a desired protein (so called pseudo-typing). The glycoproteins that able to maintain a viral particle structure, can be used as that virus's envelope proteins.



Gentarget's Lentivirus-Like Particles (VLP):

Gentarget developed the virus-like particle product line with different pseudo-typed envelope protein. They are pseudo-typed with a desired envelope protein at its surface. It is packaged with a report (GFP or Luciferase) as virion core. Such VLP are non-replicative, non-pathogenic and non-infectious to mammalian cells, or only infect the specific cell types that



containing the corresponding receptor to the pseudo-typed envelope protein. If the mammalian cells can be successfully infected with VLP, it will express its GFP or Luciferase.

COVID-19 Spike (S) Protein:

A novel coronavirus is responsible for the global healthcare crisis, start in late 2019, from Wuhan, China. On Feb 11, 2020, WHO named this virus as COVID-19 and the international Committee of Virus Taxonomy named it as SARS-Cov-2.

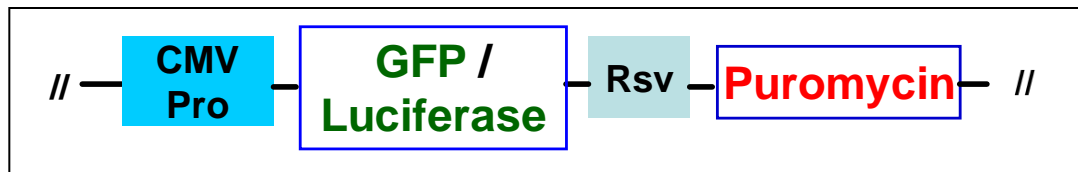
COVID-19 coronavirus binds human ACE2 receptors with high affinity through its Spike (S) protein. S protein is a glycoprotein presented on the virus surface.

Virus Like Lentiviral Particles (VLP) of S Protein:

COVID-19 Spike protein (S) Virus Like Particle was packaged in HEK293T cells using our proprietary technology. It is the replication-incompetent particles in which the native, full-length COVID-19 S protein (with **6His-tag** at its C-terminal) was pseudo-typed as the lentiviral particles' surface envelope protein.

[**Note:** This VLP has the Spike protein already expressed / presented at surface of lentiviral particle to mimic coronavirus. It is not used as lentivirus for over-expression of the Spike protein. For over-expressing COVID-19 S protein, please use lentivirus product, CAT#: LVP1329.]

This VLPs packaged with either the Green Fluorescent Protein (**GFP**) (CAT#: **VL001**) or the **firefly luciferase** (CAT#: **VLP002**), as the particle's virion genomic material although it is non-infectious to mammalian. However, when the COVID-19 S protein binding receptor (such as ACE2) is present in cell surface, this VLP will be transduced into the cells and its genomic material GFP or luciferase will be expressed in such cell types. And the VLPs carry the Puromycin resistance. The following scheme showed VLP's genomic expression cassette.



The VLP of COVID-19 S Protein has been tested in response to the binding of anti-S antibody in ELISA plate. This VLP can be detected by anti-C-terminal 6His-tag antibody because the S protein was tagged by C-term 6His-tag



The VLP was concentrated using Gentarget's lentivirus concentration kit (CAT#: [LV-CONC.](#)) and resuspended into PBS solution to obtain the desired titer. VLP's titer was measured via ELISA P24 assay. Each single particle assembled many S protein molecular at its surface.

Application for VLP of S protein:

1) Effective presentation of COVID-19 S protein antigen, or Mimic COVID-19 Structure:

The S2 protein VLPs are mimic COVID-19's spike protein exposure. The Spike protein is presented as the VLP's surface envelope in high density, and easier access to immune response. They are highly immunogenic and more effectively activate the immune response. Therefore, the most effective antibodies can be raised from the VLP. Those VLPs can be used to study the structural properties of the SARS-CoV-2 virions, and can be used for antibody development and validation, or can be used in platform for high through-put research in vaccine research and development.

2) Targeted delivery:

This VLPs can be used for the delivery of the report (GFP or Luciferase) to specific cells that contain the receptors that binding S protein.

Those VLPs are premade with high density of COVID-19 Spike protein on the surface of particle, provided as 200ul aliquots, ready to use, no need any purification. You simply coat the VLP as antigen, onto wells in ELISA plate, for its antibody / vaccine detection or validation. They can be detected by anti-Spike antibody and anti-6His antibody. Or add it into your specific cell culture expressing ACE2 receptors.

Safety Precaution:

Gentarget lentiviral particles adapts must advanced lentiviral safety features (using the third-generation vectors with self-inactivation SIN-3UTR), and the premade lentivirus is replication incompetent. However, please use extra caution when using lentiviral particles. Use the lentiviral particles in Bio-safety II cabinet. Wear glove all the time when handling Lentiviral particles! Please refer CDC and NIH's guidelines for more details regarding to safety issues.

References:

Front Bioeng. Biotechnol. 30 July 2020; Ruodan Xu et al. Construction of SARS-CoV-2 Virus-Like Particles.



Warranty:

This product is for research use only. It is warranted to meet its quality as described when used in accordance with its instructions. GenTarget disclaims any implied warranty of this product for application. In no event shall GenTarget be liable for any incidental or consequential damages in connection with the products. GenTarget's sole remedy for breach of this warranty should be, at GenTarget's option, to replace the products.

Related Products: GenTarget's Pre-made lentivirus Products:

Lentivirus Category (click to see)	Product Description
Target Expression	Premade lentivirus express a human, mouse or rat gene with Fluorescent-Antibiotic fusion dual selection.
Luciferase expression	Premade lentivirus express all kinds of luciferase: firefly; Renilla; Cypridina; Red-Luc; Nano-Luc , with different fluorescent and antibiotic selection.
Fluorescent markers	Preamde lentivirus express human codon optimized fluorescent protein, GFP / RFP / CFP / BFP / YFP/niRFP /unstable GFP, etc.
Cytoskeleton Imaging	Fluorescent (GFP / RFP/ CFP) labelled cell skeleton protein (Actin; Tubulin; Paxillin; Vimentin)
Cell Organelle imaging	Premade lentivirus for cell organelle imaging. The fluorescent labelled cell organelle lentivirus for living cell imaging.
CRISPR /hu CAS9	Preamde lentivirus express humanized wild-type Cas9 endonuclease for genomic editing by CRISPR
Fluorescent Fusion target	Lentivirus express the " Fluorescent-Target " fusion proteins. A desired target is fused to Green, Blue, Red , or Cyan Fluorescent Protein, demonstrating the target's functionality and localization
CRE recombinase	Premade lentivirus for expressing nuclear permeant CRE recombinase with different fluorescent and antibiotic markers.
LoxP ColorSwitch	Premade lentivirus expressing "LoxP- GFP-Stop-LoxP-RFP " cassette, used to monitor the CRE recombination event in vivo.
SEAP Reporter	SEAP (Secreted Embryonic Alkaline Phosphatase) secreted expression lentivirus under different promoter.



TetR repressor expression	Premade lentivirus expressin TetR (tetracycline regulator) protein, the repressor protein for the inducible expression system.
rtTA Expression	Lentivirus express the reverse tetraccycline transcription activator gene, rtTA-M2 with different selection.
Pathway Reporter	Different Report lentivirus (Luc, RFP, GFP, SEAP) under a pathway specific response promoter.
Cell Immortalization	Comprehesive lentivirus for cell immortalization, for different cell types.
Cell Specific reporter	Different Report lentivirus driven by cell specific promoter.
Infectious Antigens	Lentivirus express all kinds of infectious antigens.
Viral Like Particle (VLP)	Lentiviral particles pseudo-typed with high density of surface envelope protein.
Immuno Therapy	Lentivirus products for Immuno Therapy application.
iPS factors	Premde lentivirus for human and mouse iPS (Myc, NANOG, OCT4, SOX2, FLF4) factors with different fluourescent and antibitoic markers
LacZ expression	Express different full length β- galactosidase (lacZ) with different selection markers
Anti-miNA lentivirus	Pre-made lentivirus expression a specific anti-miRNA cassette.
Pre-made shRNA lentivirus	Premade shRNA lentivirus for knockdown a specific genes (P53, LacZ, Luciferase and more).
microRNA and anti-microRNA lentivirus	Premade lentivirus expression human or mouse precursor miRNA . And anti-miRNA lentivector and virus for human and mouse miRNA.
Negative control lentiviruses	Premade negative control lentivirus with different markers : serves as the negative control of lentivirs treatment, for validation of the specificity of any lentivirus target expression effects.
Other Enzyme	Ready-to-use lentivirus, expressing specific enzymes with different selection markers.