



Lentivirus expresses viral antigens

Cat#	Product Name	Amount
LVP1329	COVID-19 S Protein (6His) Expression Lentivirus	200 ul/vial (1x10 ⁷ IFU/ml)
LVP1330	COVID-19 S1-RBD (6His) Expression Lentivirus	
LVP1380	TSPyV small T antigen Expression Lentivirus	
LVP1381	HPyV6 small T antigen Expression Lentivirus	
LVP1382	MCPyV small T antigen Expression Lentivirus	
LVP1383	HPyV7 small T antigen Expression Lentivirus	
LVP1384	SV40 small T antigen Expression Lentivirus	
LVP1385	TSPyV Large T antigen Expression Lentivirus	
LVP1386	MCPyV Large T antigen Expression Lentivirus	
LVP1397	MCPyV VP1 Expression Lentivirus	
LVP1387	TSPyV VP1 Expression Lentivirus	
LVP1388	HPV17-E6 Expression Lentivirus	
LVP1389	HPV17-E7 Expression Lentivirus	
LVP1390	HPV38-E7 Expression Lentivirus	
LVP1329-PBS	COVID-19 S Protein (6His) concentrated Lentivirus	200 ul /vial (1x10 ⁸ IFU/ml)
LVP1401-PBS	HBcAg-6His Expression Lentivirus	
LVP1402-PBS	HBsAg-6His Expression Lentivirus	
LVP1403-PBS	HBeAg-6His Expression Lentivirus	
LVP1404-PBS	Zika Envelope Protein (6His) Expression Lentivirus	



LVP1405-PBS	Rubella Envelope Protein (6His) Expression Lentivirus
LVP1406-PBS	Dengue Envelope Protein (6His) Expression Lentivirus
LVP1407-PBS	Yellow Fever Virus Envelope Protein (6His) Expression Lentivirus
LVP1408-PBS	Sudan Ebolavirus Glycoprotein (6His) Expression Lentivirus
LVP1409-PBS	HHV-5 (h CMV) Envelope Protein B (6His) Expression Lentivirus
LVP1410-PBS	West Nile Virus Envelope Protein (6His) Expression Lentivirus
LVP1411-PBS	Measles Virus Nucleoprotein (6His) Expression Lentivirus
LVP1412-PBS	Mumps virus Nucleocapsid Protein (6His) Expression Lentivirus
LVP1413-PBS	h Polyomavirus VP3 (6His) Expression Lentivirus
LVP1488-PBS	h HPV16 E6-E7 Expression Lentivirus

Amount: 200ul/vial (1 x 10^{7~8} IFU/ml)

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

1. Introduction:

GenTarget provides lentivirus that expresses different infectious antigens, for the high expression in your desired mammalian cell type. The infection Antigen Expression lentivirus can be used in many application, such as,

- 1) Used as antigen for antibody development or antigen production in mammalian cell types;
- 2) Used for anti-infectious disease tests and screening assays;
- 3) Used for validation of antibody's binding efficiency and assays for vaccine efficiency.
- 4) Used for generation of the antigen expression cell line for cell-based assays in antigen detection and validation tests;

2. What are viral antigens?

Viral genome encodes many proteins to maintain the virus structure and function. The virus surface proteins and virus released toxic substance stimulate an immune response in its host. Those proteins that activate host's immunological responses, are called viral antigens.

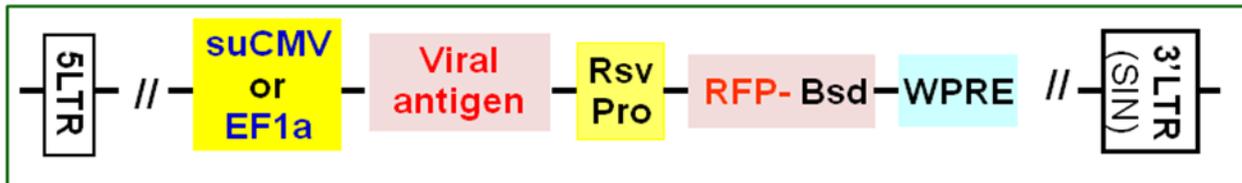


Viral antigens are used in viral detection, anti-viral antibody development, vaccine validation and so on.

3. Gentarget's lentivirus products express a viral antigen:

Gentarget developed lentivirus products expressing a specific viral antigen. The antigen (in most cases) is human codon optimized for highest expression in mammalian system, and expressed under either the enhanced CMV promoter for highest expression level in most cell types, or under an enhanced EF1a promoter for those cell types having weak CMV promoter strength or promoter silencing.

Each lentivirus contains an internal Red Fluorescent Protein report (**RFP**) for monitoring the lentivirus transformation rate in your cell type. It also contains the **Blasticidin** antibiotic selection marker which allows to select the transduced cells for long term expression (Dual selection). See expression lentivector scheme below:



Depend upon the products, the viral antigen may be expressed with the **C-terminal 6His tag (when available)**, for easy antigen purification by Ni NTA (nickel-charged affinity resin) column. The antigen may be expressed with a secretion leader which leads the expressed viral antigen into culture medium for easier purification from cell culture medium.

4. Applications for viral antigen expression lentivirus:

The envelope protein is expressed at surface of the virus. The recombinant viral envelope protein can be used as the antigen for virus detection, diagnostic assays, antibody and vaccines development, and other assays.

Those expression ready lentivirus can produce high level of viral antigen in your desired mammalian cell type, can generate cell line for your cell-based detection assay. Furthermore, you can purify the expressed antigens for raising specific antibodies for vaccine and drug development.



These ready-to-use particles are packaged in 293T cells and provided as a 200 μ l aliquot as regular lentivirus or as concentrated lentivirus in higher titer. Lentiviruses are safe and easy to use. Simply add them into cultured cells, 3 days later you can select the transduced cells, and grow up the cells to expand the target expression.

5. Transduction Protocols:

1) Transduction Protocol for Adhesive cells:

Note: Pre-made lentivirus is provided ready to use, so it can be simply added into your cell culture; the amount of virus to add depends on cell type. For quick transduction, add 50 μ l of virus into each well of 24-well-plate where cell density is 50% to 75%. After 72 hours (no need to change medium), visualize positive transduction rate by fluorescence microscopy. For stable cell line generation, pass cells into medium containing antibiotic or perform fluorescence cell sorting followed by antibiotic selection.

Day 0:

Seed cells in complete medium at the appropriate density and incubate overnight.

Note: at the time of transduction, cells should be 50%-75% confluent. For example, seed HeLa cells at 0.5×10^5 /ml x 0.5ml in a well of a 24-well plate.

Day 1:

- Thaw the pre-made lentiviral stock at room temperature and add the appropriate amount of virus stock to obtain the desired MOI.
- Return cells to 37°C, CO₂ incubator. Do nothing.

Note: Try to avoid freezing and thawing. If you do not use all of the virus at one time, you may re-freeze the virus at -80 °C for future use; virus titer will decrease by ~10% for each freeze/thaw cycle.

Day 3:

At 48hr~72hr (Depend upon cell type) after transduction, check the transduction rate by fluorescence microscopy or calculate the exact transduction rate by flow cytometry (FACS or Guava).

Day 3 + (optional):

Sort transduced cells by FACS, or select by antibiotic killing. A pilot experiment should be done to determine the antibiotic's kill curve for



your specific cell line (refer to the pertinent literature on generation of stable cell lines).

2) Transduction Protocol for Suspension Cells:

Grow cells in complete suspension culture medium; use a shaking flask in a CO² incubator if required.

Measure cell density (not grow over 3 million/ml), measured viability should be > 90%. Dilute cells into 1 x 10⁶ cell/ml in complete medium.

Day 1:

- Thaw lentiviral particles at room temperature.
- Add premade lentiviral particles into the diluted cells at a ratio of: 50 to 100 µl virus per 0.5 ml of cells (Note: depending on cell type, you may need to use more or less virus).
- Grow cells in a shaking flask in a CO₂ incubator.

Day 2:

At 24 hours after transduction, add an equal amount of fresh medium containing. Continue growing cells in CO₂ incubator.

Day 3+:

At 48 hour to 72 hours (Depend upon cell type) after transduction, check fluorescence with a fluorescence microscope or calculate the transduction efficiency using a cell sorter such as FACS or Guava. Pass cells into 0.5 million/ml density in completed medium containing the corresponding antibiotic (**Note:** amount of antibiotic depends on cell type. A killing curve must pre-established). Sort for fluorescence positive cells and maintain antibiotic selection to generate a stable cell line.

Note: Filter wavelength settings:

RFP filter: ~Ex558 ~Em583;

6. 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.



7. References:

1. J Virol. 2000 November; 74(22): 10778–10784.
2. Hum Gene Ther (2003) 14: 1089-105.
3. Mol Ther (2002) 6: 162-8.
4. NIH Guidelines for [Biosafety Considerations for Research with Lentiviral Vectors](#). (Link).

8. 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 particular 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.

9. Attachment: GenTarget's pre-made lentivirus product category.

Product Category	Product Description (please click into each category's page)
Pathway Reporter	Repoter Lentivirus for all kinds of pathway screening assays
Cell Immortalization	Lentivirus for cell immortalization: Large T-antigen, hTERT, EBNA1/EBNA2, HpV16-E6/E7, Adenovial E1A, Kras_G12V, HOXA9, et al.
ImmunoOncology Research	Lentivirus products for immuno therapy research: CAR and TCR; Assay Cell Lines for T-cell targeted killing assay and other cell-based assays; over-expression lentivirus products for the immune response targets; Cell surface antigens (CDs); immune checkpoint / Receptors; CRISPR gene Repair and knock-IN lentivirus; CRISPR knockout lentivirus;
CAR-T, TCR Lentivirus	CARs Lentivirus: Anti-CD19 /CD20 /CD22 /BCMA /hHER2 /HLA-A2 /TGFβ; TCRs : MART-1/ NY-ESO1/ CD1d-α-GalCer/ TRaV3-F2A-TRβV5-6;
CRISPR Gene Editing	Preamde lentivirus express humanized wild-type Cas9 endonuclease, the dCas9 , gRNAs, CRISPR gene editing research
Epigenomic: CRISPRi and CRISPRa	" dCas9-Protein " fusion Lentivirus for epigenomic modification, resulted in CRISPR interference (CRISPRi) or activation (CRISPRa).
Cell-Specific Reporter	a set of reporter lentiviruses to express a luminescence or fluorescent reporter (firefly Luciferase, Renilla luciferase, RFP or GFP fluorescent marker) under a



Product Category	Product Description (please click into each category's page)
	tissue specific promoter
Infectious Antigens	Lentivirus that express all kinds of infectious antigens with C-term 6His-tag.
Virus Like Particles (VLP)	Lentiviral Like Particles, pseudo-typed with a different envelope proteins.
Non-integrating LV	Integration Defective Lentivirus, express different targets for transient expression without the unwanted insertional mutagenesis.
shRNA Knockdown	Knockdown verified and customized shRNA lentivirus for target knockdown,
microRNA lentivirus	Premade lentivirus expression human or mouse precursor miRNA . And anti-miRNA lentivector and virus for human and mouse miRNA.
Anti-miRNA lentivirus	Pre-made lentivirus expression a specific anti-miRNA cassette.
Human and mouse ORFs	Premade lentivirus express in a human, mouse or rat gene with RFP-Blasticidin fusion dual markers.
Luciferase expression	Premade lentivirus for all kinds of luciferase protein expression: firefly and Renilla, Red-Luc and more , with different antibiotic selection markers.
Fluorescent Markers	Lentivirus express all commonly used fluorescent proteins: GFP, RFP, CFP, BFP YFP, mRFP, unstable GFP and others.
Luminescent Imaging	Lentivirus express Nano-Lantern as Bio-probes for in vivo imaging of sub-cellular structural organization and dynamic processes in living cells and organisms
Sub-cellular Imaging	Lentivirus contain a well-defined organelle targeting signal fused to a fluorescent protein, great tools for live-cell imaging and for dynamic investigation of sub-cellular signal pathways.
Cytoskeleton Imaging	A fluorescent marker (GFP, RFP or CFP) fusion with a cellular structure protein, provides a convenient tool for visualization of cytoskeletal structure
Unstable GFP	Lentivirus express the destabilized GFP (uGFP) which provides fast turnover responses in signal pathway



Product Category	Product Description (please click into each category's page)
	assay and in knockdown / knockout detection
near-infrared RFP	The near-infrared Red fluorescent (niRFP) expression Lentiviruses provides the whole-body images with better contrast and brighter images
Fluorescent-ORF fusion	Pre-made lentivirus expression a " GFP/RFP/CFP-ORF " fusion target.
CRE recombinase	Premade lentivirus for expressing nuclear permeant CRE recombinase with different fluorescent and antibiotic markers.
CRE, Flp ColorSwitch	Lentivirus expressing "LoxP-GFP-Stop-LoxP-RFP" or "FRT-GFP-Stop-FRT-RFP" cassette, used to monitor the CRE or Flp recombination event in vivo.
SEAP Reporter	lentivirus expressing SEAP under different promoters (TetCMV, EF1a, CAG, Ubc, mPGK, Actin-beta or a signal pathway responsive promoter),
TetR Repressor	Premade lentivirus expressing TetR (tetracycline regulator) protein, the repressor protein for the inducible expression system.
rtTA Expression	rtTA binds to the tetracycline operator element (TetO) in the presence of doxycycline (Dox). Used for Tet-On /OFF inducible system.
iPS factors	Premade lentivirus for human and mouse iPS (Myc, NANOG, OCT4, SOX2, FGF4) factors with different fluorescent and antibiotic markers
LacZ expression	Express different full length β-galactosidase (lacZ) with different selection markers
Negative control lentiviruses	Premade negative control lentivirus with different markers : serves as the negative control of lentivirus treatment, for validation of the specificity of any lentivirus target expression effects.
Other Enzyme expression	Ready-to-use lentivirus, expressing a specific enzymes with different selection markers.
Ultra titer lentivirus	Ultra-titer lentivirus used for the hard-to-transduced cells and for in vivo manipulation of sperm cells, or stem cells.



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