



## Trans-Up™ Lentivirus transduction enhancer

Catalog#	Product Name	Amounts
<a href="#">T-UP</a>	Trans-Up Lentivirus transduction enhancer	1.0 ml (500x stock, filter-sterilized)

**Storage:** store at 4°C to -20°C, sustain to thaw-frozen cycle. Stable for 6 months.

### What is transduction enhancer and where it is necessary to use?

Lentiviral Particles (Lentivirus) is the most popular delivery tool for over-expression, knockdown and much more. It demonstrates great advantage in many applications, like T cell engineering, immunotherapy, gene editing. However, low transduction efficiency is the significant problem in those applications. Therefore, the transduction enhancer is much needed.

Transduction enhancer efficiently boost lentivirus (or retrovirus) transduction rate, which greatly benefit the *in vitro* lentivirus applications, like gene therapy (CRISPR), immune therapy (CAR-T) where the lentivirus transduction is often challenge for the cell types such as in T cells, macrophages and hematopoietic stem cells.

### How the enhancer works?

In most cell types, lentivirus transduction rate is generally efficient, and can be enhanced to some degree by polybrene. Polybrene is a cationic polymer that neutralizing the charge between virial particle and cell surface. But, in the cases of hard-to-transduce cells, the transduction rate is very low.

GenTarget developed a novel transduction enhancer (**Trans-Up™**). It is the poly-cations and non-ionic amphiphilic molecules mixture using a proprietary process. This nontoxic chemical-based enhancer increases the transduction efficiency by neutralizing the particles' and cell surface charges and modulating cell membrane permeability, which condenses lentivirus and bridge into to cells. Whether for difficult-to-transduce cell type of just want to ensure high transduction rate, the Trans-Up can increase transduction rate by 2-8 folds depend upon cell types and original lentivirus transduction efficiency.



## Trans-Up™ Enhancer Features

1. **Easy-to-use**, simply add it into cell culture medium at time of lentivirus transduction, regardless of the lentivirus pre-mixed with polybrene or not; no need to change medium after infection;
2. **Efficient**: enhances the transduction efficiency up to 8-folds;
3. **No cell toxicity** at the working concentration of the enhancer.
4. **Flexible**: enhance lentivirus and retrovirus in a wide variety of cell types, compatible with all types of packaged lentivirus.

## Transduction Protocol

### Day 1.

Plate your cells of interest into the desired plate (24 well or 6-well plate), grow cell overnight so the cell density at 50% to 80% at time of transduction.

### Day 2.

- 1) Dilution the Transduction-Up enhancer into completed medium as 1:500, for example, add **2ul enhancer per 1 ml medium**.
- 2) Remove medium from the cell culture, replaced with the fresh made completed medium containing enhancer.
- 3) Add each well with lentivirus at the virus level of MOI=10 (or an optimal MOI as desired). Gentle swirl to mix. We recommend use simply add 50ul lentivirus into one well in 24 well/plate, scale up according to culture size. Continue to incubate cells at 37oC with 5% CO<sub>2</sub>.

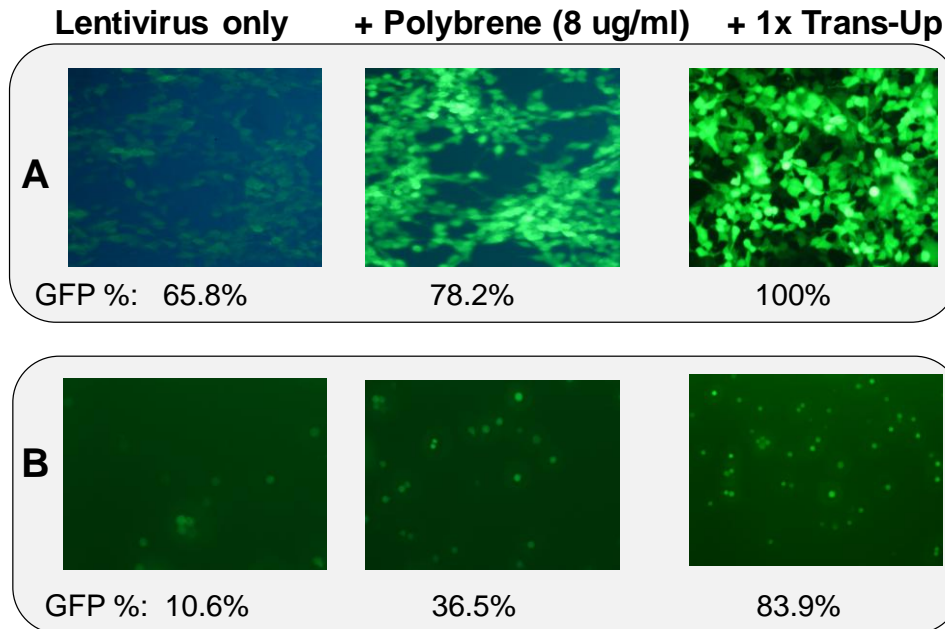
**Note:** MOI is the number of viral particles per cell. For example, for  $0.5 \times 10^5$  cells/per well in 24-w/p, add 50ul virus at titer of  $1 \times 10^7$  IFU/ml (which is 0.5 million particles), the MOI=10.

### Day 4 or 5, and on.

Depend upon lentivirus' promoter, the gene expression peaked at 48 to 72 hours post infection. The cells can be subject to antibiotic selection or sorting, or visualization of the expressed signal under fluorescent microscope.



## Example results:



**Figure 1: Transduction efficiencies in two cell types. Panel A:** add 50ul GFP lentivirus (Cat#: LVP340) into one well in 24-well-plate containing HT1080 cell ~75% density. Image taken at ~72 hours after virus added (no medium changed). **Panel B:** add 50 ul lentivirus (CAT#: LVP426) into RPMI 8266, human B lymphocyte cells.

**\*Note:** In some cases, if your cell does not uptake the lentivirus at all, then the enhancer will not be able to boost the transduction efficiency. It simply means your cell type is just not susceptible to lentivirus because of its anti-viral mechanism.

## Technical support:

For any questions, please visit our website at <https://www.gentarget.com/contact/> or email us to [Support@gentarget.com](mailto:Support@gentarget.com)

## Warranty and Terms:

- 1) Gentarget warrants that the Product meets the specifications described in this manual. If the Product fails to meet these specifications, Gentarget will replace the Product or provide the purchaser with a refund upon the verification of the product failure by Gentarget. Such replacement or refund must be submitted to Gentarget within 30 days of receipt of the product. The S/H is not refundable. This limited



warranty shall not extend to anyone other than the original purchaser of the Product.

- 2) Please be advised, in some cases where the cells do not uptake any lentivirus or has extremely low transduction rate, the enhancer will not be able to boost the transduction efficiency. This is the nature of the science and cannot be counted as product failure or bad product quality.
- 3) This product is intended for cellular research use only, not to be used for animal in vivo applications.

**Attachment:** GenTarget's pre-made lentivirus product categories.

<b>Product Category</b>	<b>Product Description (please click into each category's page)</b>
<a href="#">Pathway Reporter</a>	Repoter Lentivirus for all kinds of pathway screening assays
<a href="#">Cell Immortalization</a>	Lentivirus for cell immortalization: Large T-antigen, hTERT, EBNA1/EBNA2, HpV16-E6/E7, Adenovial E1A, Kras_G12V, HOXA9, et al.
<a href="#">ImmunoOncology Research</a>	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;
<a href="#">CAR-T, TCR Lentivirus</a>	<b>CARs</b> Lentivirus: Anti-CD19 /CD20 /CD22 /BCMA /hHER2 /HLA-A2 /TGFβ; <b>TCRs</b> : MART-1/ NY-ESO1/ CD1d-α-GalCer/ TRαV3-F2A-TRβV5-6;
<a href="#">CRISPR Gene Editing</a>	Preamde lentivirus express humanized wild-type <b>Cas9</b> endonuclease, the <b>dCas9</b> , gRNAs, <b>CRISPR</b> gene editing research
<a href="#">Epigenomic: CRISPRi and CRISPRa</a>	" <b>dCas9-Protein</b> " fusion Lentivirus for epigenomic modification, resulted in CRISPR interference (CRISPRi) or activation (CRISPRa).
<a href="#">Cell-Specific Reporter</a>	a set of reporter lentiviruses to express a luminescence or fluorescent reporter (firefly Luciferase, Renilla luciferase, RFP or GFP fluorescent marker) under a tissue specific promoter



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



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