

## pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 Vector

**Catalog No.**

631990

**Amount**10  $\mu$ g**Lot Number**

Specified on product label.

### Product Information

pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 is a lentiviral expression vector that can be used to generate high-titer lentivirus for transducing virtually any dividing or nondividing mammalian cell type, including primary and stem cells. The vector allows a gene-of-interest to be fused to the N-terminus of the fluorescent protein DsRed-Monomer. Expression of the fusion is driven by the human elongation factor 1 alpha (EF1 $\alpha$ ) promoter, which continues to be constitutively active even after stable integration of the vector into the host cell genome. Stable expression of the fusion allows the monitoring of a variety of cellular processes (such as differentiation in primary or stem cells), without the transgene silencing associated with CMV promoters. In addition, the vector allows efficient flow cytometric detection of stably or transiently transfected mammalian cells expressing DsRed-Monomer fusions, without time-consuming drug and clonal selection.

### Package Contents

- 1 tube of pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 Vector (20  $\mu$ l/tube)

### Storage Conditions

- Store plasmids at  $-20^{\circ}\text{C}$ .
- Spin briefly to recover contents.
- Avoid repeated freeze/thaw cycles.

### Shelf Life

- 1 year from date of receipt under proper storage conditions.

### Storage Buffer

- 10 mM Tris-HCl (pH 8.0), 1 mM EDTA (pH 8.0)

### Concentration

- 500 ng/ $\mu$ l

### Shipping Conditions

- Dry ice ( $-70^{\circ}\text{C}$ )

### Product Documents

Documents for our products are available for download at [takarabio.com/manuals](http://takarabio.com/manuals)

The following documents apply to this product:

- Lenti-X Lentiviral Expression Systems User Manual
- pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 Vector Information

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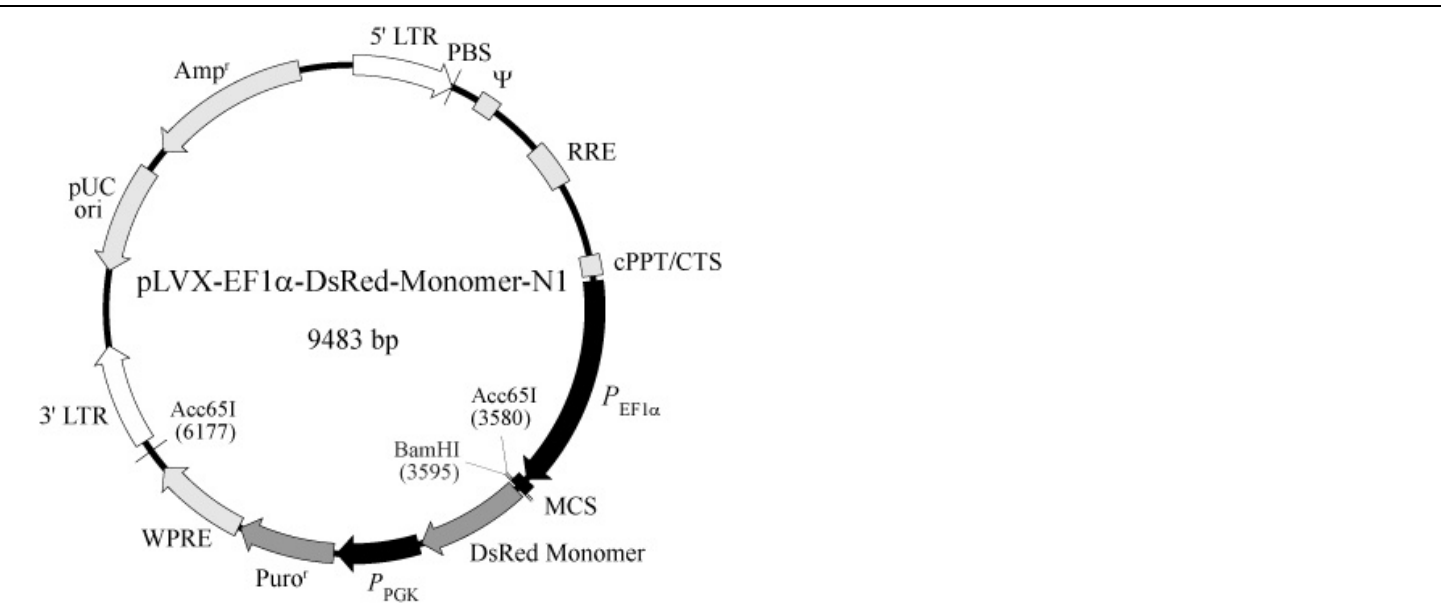


Figure 1. pLVX-EF1α-DsRed-Monomer-N1 vector map.

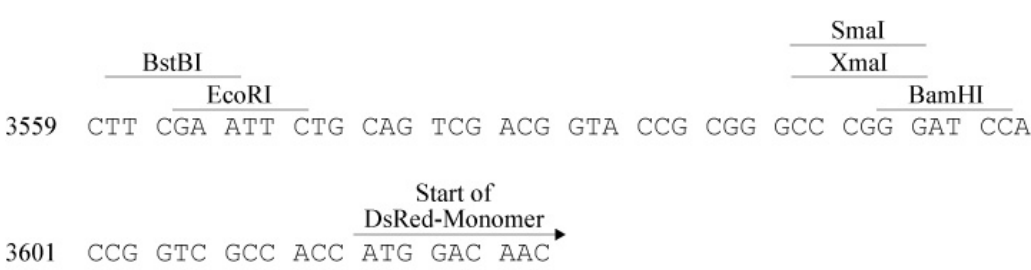


Figure 2. pLVX-EF1α-DsRed-Monomer-N1 multiple cloning site (MCS).

Description

pLVX-EF1α-DsRed-Monomer-N1 is an HIV-1-based, lentiviral expression vector designed to constitutively express a protein of interest fused to the N-terminus of DsRed-Monomer, a monomeric mutant of the *Discosoma* sp. red fluorescent protein DsRed (Nat. Biotechnol., 1999). The excitation and emission maxima of native DsRed-Monomer are 557 nm and 585 nm, respectively. Stable, constitutive expression of the fusion protein is driven by the EF1α promoter ( $P_{EF1\alpha}$ ), which continues to be constitutively active even after the vector integrates into the host cell genome (Stem Cells Dev., 2008).

pLVX-EF1α-DsRed-Monomer-N1 contains all of the viral processing elements necessary for the production of replication-incompetent lentivirus, as well as elements to improve viral titer, transgene expression, and overall vector function. The woodchuck hepatitis virus posttranscriptional regulatory element (WPRE) promotes RNA processing events and enhances nuclear export of viral RNA (J. Virol., 1999), leading to increased viral titers from packaging cells. In addition, the vector includes a Rev-response element (RRE), which further increases viral titers by enhancing the transport of unspliced viral RNA out of the nucleus (Proc. Natl. Acad. Sci. USA, 1990). Finally, pLVX-EF1α-DsRed-Monomer-N1 also contains a central polypurine tract/central termination sequence element (cPPT/CTS). During target cell infection, this element creates a central DNA flap that increases nuclear import of the viral genome, resulting in improved vector integration and more efficient transduction (Cell, 2000).

In addition to lentiviral elements, pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 contains a puromycin resistance gene (Puro<sup>r</sup>) under the control of the murine phosphoglycerate kinase (PGK) promoter ( $P_{PGK}$ ) for the selection of stable transductants. The vector also contains a pUC origin of replication and an *E. coli* ampicillin resistance gene (Amp<sup>r</sup>) for propagation and selection in bacteria.

### Location of Features

- 5' LTR (5' long terminal repeat): 1–635
- PBS (primer binding site): 636–653
- $\Psi$  (packaging signal): 685–822
- RRE (Rev-response element): 1303–1536
- cPPT/CTS (central polypurine tract/central termination sequence): 2028–2151
- $P_{EF1\alpha}$  (human elongation factor 1 alpha promoter): 2185–3519
- MCS (multiple cloning site): 3560–3599
- DsRed-Monomer (human-codon-optimized): 3613–4290
- $P_{PGK}$  (phosphoglycerate kinase promoter): 4310–4818
- Puro<sup>r</sup> (puromycin resistance gene): 4839–5438
- WPRE (woodchuck hepatitis virus posttranscriptional regulatory element): 5452–6043
- 3' LTR (3' long terminal repeat): 6246–6882
- pUC origin of replication: 7351–8024 (complementary)
- Amp<sup>r</sup> (ampicillin resistance gene;  $\beta$ -lactamase): 8169–9165 (complementary)

### Additional Information

Genes cloned into the MCS must: be in-frame with the DsRed-Monomer coding sequence; contain a start codon (ATG); and lack in-frame stop codons. pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 will constitutively express your N-terminal DsRed-Monomer fusion when transduced into target cells. Before the vector can be transduced into target cells, however, it must be packaged into viral particles in HEK293T cells, using our Lenti-X<sup>TM</sup> HTX Packaging System (Cat. Nos. 631247 and 631249). This packaging system allows the safe production of high titer, infectious, replication-incompetent, VSV-G pseudotyped lentiviral particles that can infect a wide range of cell types, including nondividing and primary cells (Mol. Ther., 2000).

#### Caution!

The viral supernatants produced by this lentiviral vector could contain potentially hazardous recombinant virus. Due caution must be exercised in the production and handling of recombinant lentivirus. Appropriate NIH, regional, and institutional guidelines apply.

### Selection of Stable Transfectants

- Selectable marker: plasmid confers resistance to puromycin.

### Propagation in *E. coli*

- Suitable host strains: DH5 $\alpha$ , HB101 and other general purpose strains.
- Selectable marker: plasmid confers resistance to ampicillin (100  $\mu$ g/ml) in *E. coli* hosts.
- *E. coli* replication origin: pUC
- Copy number: high

# Certificate of Analysis

Cat. No. 631990

pLVX-EF1 $\alpha$ -DsRed-Monomer-N1 Vector

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## Excitation and Emission Maxima of DsRed-Monomer

- Excitation: 557 nm
- Emission: 585 nm

## References

1. Matz, M. V., *et al.* (1999) *Nat. Biotechnol.* **17**(10):969–973.
2. Wang, R. *et al.* (2008) *Stem Cells Dev.* **17**(2):279–289.
3. Zufferey, R. *et al.* (1999) *J. Virol.* **73**(4):2886–2892.
4. Cochrane, A. W. *et al.* (1990) *Proc. Natl. Acad. Sci. USA* **87**(3):1198–1202.
5. Zennou, V. *et al.* (2000) *Cell* **101**(2):173–185.
6. Wu, X. *et al.* (2000) *Mol. Ther.* **2**(1):47–55.

## Quality Control Data

### Plasmid Identity & Purity

- Digestion with the indicated restriction enzymes produced fragments of the indicated sizes on a 0.8% agarose/EtBr gel:

Enzyme(s)	Fragment(s)
BamHI	9.5 kb
Acc65I	2.6 & 6.9 kb

- Vector identity was confirmed by sequencing.
- A<sub>260</sub>/A<sub>280</sub>: 1.8–2.0

It is certified that this product meets the above specifications, as reviewed and approved by the Quality Department.

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### STATEMENT 44

The DsRed-Monomer and the Fruit Fluorescent Proteins are covered by one or more of the following U.S. Patents: 7,005,511; 7,157,566; 7,393,923 and 7,250,298.

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## STATEMENT 55

cPPT Element. This product and its use are the subject to one or more of the following U.S. Pat. Nos. 6,682,907, 7,981,671, 8,093,042, 8,367,068, 8,460,678, 8,512,994 and foreign equivalents. The purchase of this product conveys to the buyer the non-transferable right to use the purchased amount of the product and components of the product in research conducted by the buyer (whether the buyer is an academic or for-profit entity). The buyer cannot disclose information, sell or otherwise transfer this product, its components or materials made using this product or its components to a third party or otherwise use this product or its components or materials made using this product or its components for any commercial purposes. If the buyer is not willing to accept the limitations of this limited use statement, Takara Bio USA, Inc. is willing to accept return of the product with a full refund. For information on purchasing a license to the DNA-Flap technology for purposes other than research, contact the Transfer of Technology Office, Institut Pasteur, 28 rue du Docteur Roux, 75 724 Paris Cedex 15 ([www.pasteur.fr](http://www.pasteur.fr)).

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