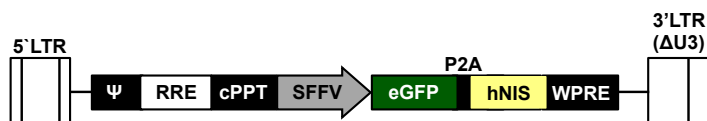


Product Description

Product Name:	LV-eGFP-P2A-hNIS
Catalog Number:	LV020-S (0.25 mL) or LV020-L (1 mL)
Lot Number:	LV-IM20
Reporter genes:	Enhanced green fluorescent protein (eGFP) Human sodium iodide symporter (hNIS)
Promoter:	Spleen focus-forming virus (SFFV)
Quantity:	250 μ L (S) or 1 mL (L)
Titer:	2.38×10^8 TU/mL*
Storage media:	Serum free media
Shipping:	Dry ice
Storage:	Store at $\leq -70^\circ\text{C}$ upon receipt. Freeze-thaw cycles will decrease titer.
Shelf life:	One year from date of receipt under proper storage conditions.

This is a ready-to-use lentivirus preparation. The virus encodes the enhanced green fluorescent protein (eGFP) cDNA linked to the human sodium iodide symporter (hNIS) cDNA via a P2A cleavage peptide; the spleen focus-forming virus (SFFV) promoter transcriptionally controls expression of the eGFP-P2A-hNIS cDNA (see below). The lentiviral vector is a 2nd generation, self-inactivating (SIN) vector in which the viral enhancer and promoter have been deleted. Transcription inactivation of the LTR in the SIN provirus increases biosafety by preventing mobilization by replication competent viruses and enables regulated expression of the genes from the internal promoters without *cis*-acting effects of the LTR¹.



5' LTR: 5' long terminal repeat
 ψ : RNA packaging signal
 RRE: Rev response element
 cPPT: Central polyurine tract
 SFFV: Spleen focus-forming virus promoter
 eGFP: enhanced green fluorescent protein
 P2A: P2A cleavage peptide
 hNIS: Human sodium iodide symporter
 WPRE: Woodchuck hepatitis virus posttranscriptional regulatory element
 3' LTR/ Δ U3: 3' self-inactivating long terminal repeat

*Titration by qPCR:

A WPRE probe-based qPCR assay was used to measure the number of copies of lentiviruses stably integrated into the genome after transduction of HeLa H1 cells (transducing units per mL).

Traditional p24 ELISA titrations measure both functional and non-functional lentivirus particles. However, this method overestimates the functional titer, as the p24 protein pool includes a variable amount of free p24 and p24 associated with non-functional vector particles. This ratio can vary greatly between each lot, so the titration is inherently inaccurate. While qPCR titers may appear lower than p24 ELISA, they are more accurate and functional.

Basic Lentivirus Transduction Protocol

Volumes are given for a 6-well plate; increase or decrease as needed. See the Transduction Tips section for additional considerations/modifications.

1. Seed cells in complete medium at an appropriate density to achieve 60-70% confluency the next day (e.g. $\sim 2.5 \times 10^5$ HeLaH1 cells). Incubate cells overnight in a $37^\circ\text{C}/5\%$ CO_2 incubator.
2. Thaw lentivirus stock on ice.
3. In a microcentrifuge tube, dilute lentivirus to 1 mL total in serum free media. (See tips below for notes about determining optimal MOIs.)
4. Remove culture medium from cells and replace with prepared lentivirus.
5. Return cells to $37^\circ\text{C}/5\%$ CO_2 incubator.
6. After 4 hours add 1 mL complete medium to each well and return cells to $37^\circ\text{C}/5\%$ CO_2 incubator.
7. 3 days after transduction, check transgene expression according to an appropriate protocol.

Transduction Tips

1. To determine the optimal MOI for transductions: plate several wells of the target cells and infect with increasing MOIs (e.g 1, 3, 10, and 30). Typically, primary cells require higher MOIs than established cell lines.
2. **Polybrene**[®] (Imanis #REA001) can be added to the transduction mixture to enhance transduction efficiency². The final concentration of Polybrene[®] in the transduction medium should be 4-8 $\mu\text{g}/\text{mL}$. *Polybrene*[®] can be cytotoxic to some cells and it is not advisable to incubate these cells with *Polybrene*[®] overnight; the transduction cocktail may be removed after 3-4 h and replaced with complete media.
3. A spin infection can also be used to increase transduction efficiency³. Once the transduction mixture is added to the cells, centrifuge the plate at 800 x g for 30 min at room temperature, before placing the cells in a $37^\circ\text{C}/5\%$ CO_2 incubator.
4. The presence of serum in the transduction mixture can greatly affect transduction efficiency⁴. In general, lower serum concentrations result in higher transduction efficiencies, though optimizing serum concentrations is recommended for each cell type.

References

- ¹Miyoshi et al. J Virol. 1998. 72:8150-8157.
- ²Konopka et al. J Gen Virol 1991. 72: 2685-2696.
- ³O'Doherty et al. J Virol. 2000. 74:10074-10080.
- ⁴Andreadis and Palsson. Human Gene Ther. 1997. 8:285-291.

Safety Precaution:

All culture work with lentiviruses should be performed by trained personnel and performed under BSL2 containment following NIH guidelines.

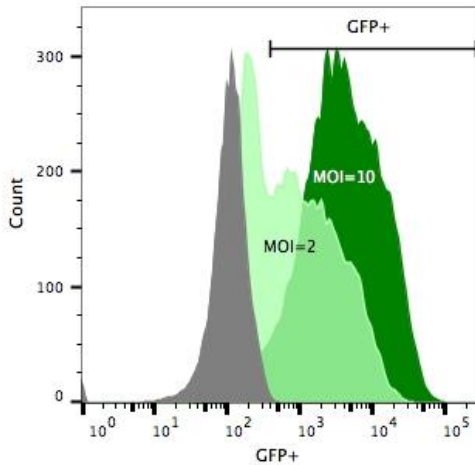


Certificate of Analysis

Testing performed by Imanis Life Sciences

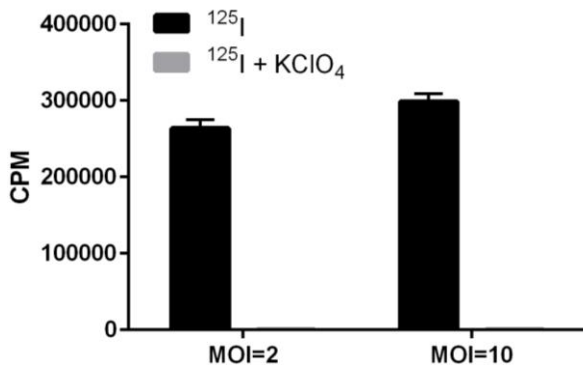
Test description	Result
Virus titer	2.38 x 10 ⁸ TU/mL
Sterility	No contamination detected
Endotoxin testing	Pass QC
NIS expression	Pass QC
Fluorescence expression	Pass QC

Fluorescence Expression:



HeLaH1 cells were transduced with LV-eGFP-P2A-hNIS at the indicated MOIs. After 6 days fluorescence expression of the transduced (green) and untransduced parental HeLaH1 cells (grey) was analyzed by flow cytometry.

NIS Expression:



HeLaH1 cells were transduced with LV-eGFP-P2A-hNIS at the indicated MOIs. After 1 week ¹²⁵I uptake by the cells was measured in the presence or absence of KClO₄, an inhibitor of NIS-mediated ¹²⁵I uptake.

Legal Disclaimers

Limited Product Warranty

This warranty limits our liability to replacement of this product. No other warranties of any kind, express or implied, including, without limitation, implied warranties of merchantability or fitness for a particular purpose, are provided by Imanis. Imanis shall have no liability for any direct, indirect, consequential, or incidental damages arising out of the use, the results of use, or the inability to use this product.

For *in vitro* use only. This certificate is a declaration of analysis at the time of manufacture.

PURCHASER NOTIFICATION

LIMITED LICENSE NOTICE – RESEARCH USE ONLY

IMANIS LIFE SCIENCES HAS A LIMITED LICENSE UNDER PATENTS OWNED BY THE SALK INSTITUTE FOR BIOLOGICAL STUDIES THAT PERMITS IMANIS LIFE SCIENCES TO SELL PRODUCTS CONTAINING WPRE FOR RESEARCH USE ONLY AND NOT FOR ANY COMMERCIAL USES. EXCLUDED COMMERCIAL USES INCLUDE WITHOUT LIMITATION MANUFACTURING, PROVIDING A SERVICE, THERAPEUTIC, DIAGNOSTIC AND PROPHYLACTIC USES, AND ANY OTHER COMMERCIAL USES. USE OF THIS PRODUCT BY A PURCHASER FOR ANY PURPOSE OTHER THAN FOR RESEARCH IS UNAUTHORIZED AND PROHIBITED.

The Salk Institute actively licenses its patents for commercial uses, and a commercial use license may be available for Salk's WPRE patents. If you wish to inquire about such a license, please contact:

Office of Technology Development
The Salk Institute for Biological Studies
10010 North Torrey Pines Road
La Jolla, CA 92037
Phone: (858) 453-4100 extension 1278
Fax: (858) 546-8093

THE NIS GENE AND TECHNOLOGY IS COVERED UNDER AN EXCLUSIVE LICENSE TO IMANIS LIFE SCIENCES. RESEARCHERS MAY USE THIS PRODUCT FOR RESEARCH USE ONLY AND NO COMMERCIAL USE IS ALLOWED. NO OTHER USE OR TRANSFER OF THIS PRODUCT OR DERIVATIVES IS AUTHORIZED WITHOUT THE PRIOR EXPRESS WRITTEN CONSENT OF IMANIS. WITH RESPECT TO ANY USES OUTSIDE THIS LABEL LICENSE, INCLUDING ANY DIAGNOSTIC, THERAPEUTIC OR PROPHYLACTIC USES, PLEASE CONTACT IMANIS LIFE SCIENCES FOR SUPPLY AND LICENSING INFORMATION.

Chief Operations Officer
Imanis Life Sciences
221 1st Ave SW STE 102
Rochester MN 55902
Tel: (507) 218-2559
Email: info@imanislife.com

Quality control by: JKM
Quality Assurance by: RLV
Effective Date: 27-Jan-2017