

## Certificate of Analysis

### pGL4.48[*Luc2P*/SBE/Hygro] Vector:

<b>Part No.</b>	<b>Size</b>
E367A	20µg

**Description:** The pGL4.48[*Luc2P*/SBE/Hygro] Vector<sup>(a-f)</sup> contains three copies of a Smad binding element (SBE) that drives transcription of the luciferase reporter gene *Luc2P* (*Photinus pyralis*). *Luc2P* is a synthetically derived luciferase sequence with humanized codon optimization that is designed for high expression and reduced anomalous transcription.

The *Luc2P* gene contains hPEST, a protein destabilization sequence, which allows *Luc2P* protein levels to respond more quickly than those of *Luc2* to induction of transcription. The vector backbone contains an ampicillin resistance gene to allow selection in *E. coli* and a gene for hygromycin resistance to allow selection of stably transfected mammalian cell lines.

**Concentration:** 1µg/µl.

**GenBank® Accession Number:** JQ858517.

**Storage Buffer:** The pGL4.48[*Luc2P*/SBE/Hygro] Vector is supplied in 10mM Tris-HCl (pH 7.4), 1mM EDTA.

**Storage Conditions:** See the product information label for storage temperature recommendations. Avoid multiple freeze-thaw cycles and exposure to frequent temperature changes. See the expiration date on the product information label.

**Usage Note:** Concentration gradients may form in frozen products and should be dispersed upon thawing. Mix well prior to use.

Part# 9PIE367  
Printed 6/12



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## Quality Control Assays

**Nuclease Assay:** Following incubation of 1µg of the vector in Restriction Enzyme Buffer at 37°C for 16–24 hours, no evidence of nuclease activity is detected by agarose gel electrophoresis.

**Physical Purity:**  $A_{260}/A_{280} \geq 1.80$ ,  $A_{260}/A_{250} \geq 1.05$ .

**Sequence:** The pGL4.48[*Luc2P*/SBE/Hygro] Vector has been completely sequenced and has 100% identity with the published sequence, available at: [www.promega.com/vectors/](http://www.promega.com/vectors/)



**Promega**

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Part# 9PIE367  
Printed in USA. 6/12.

Signed by:

J. Stevens, Quality Assurance

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<sup>(b)</sup>Licensed under U.S. Pat. No. 6,100,032.

<sup>(c)</sup>U.S. Pat. No. 7,728,118.

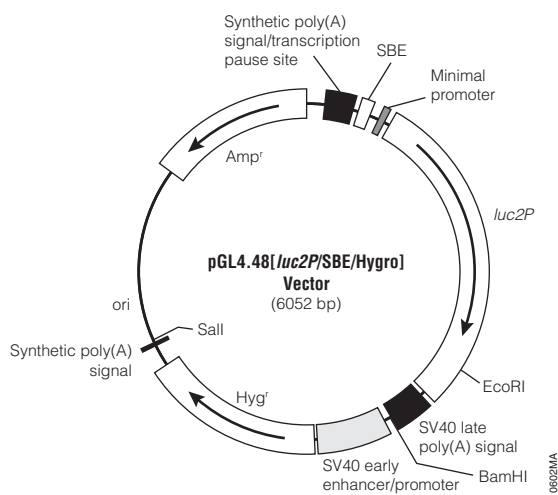
<sup>(d)</sup>U.S. Pat. No. 5,670,356.

<sup>(e)</sup>U.S. Pat. No. 8,008,006 and European Pat. No. 1341808.

<sup>(f)</sup>The method of recombinant expression of *Coleoptera* luciferase is covered by U.S. Pat. Nos. 5,583,024, 5,674,713 and 5,700,673. A license (from Promega for research reagent products and from The Regents of the University of California for all other fields) is needed for any commercial sale of nucleic acid contained within or derived from this product.

### pGL4.48[*luc2P*/SBE/Hygro] Vector Features List and Map:

SBE response element	285–332
Minimal promoter	378–408
<i>luc2P</i> reporter gene	441–2216
SV40 late poly(A) signal	2256–2477
SV40 early enhancer/promoter	2525–2943
Synthetic hygromycin (Hyg <sup>r</sup> ) coding region	2968–4005
<i>ColE1</i> -derived plasmid replication origin	4401
Synthetic β-lactamase (Amp <sup>r</sup> ) coding region	5192–6052
Synthetic poly(A) signal sequence	4029–4077
Synthetic poly(A) signal/transcriptional pause site	105–258
Reporter Vector primer 3 (RVprimer3) binding region	207–226
Reporter Vector primer 4 (RVprimer4) binding region	4144–4163



Sequence information for the pGL4 Vectors is available online at: [www.promega.com/vectors/](http://www.promega.com/vectors/)

### Example Protocol

In this example protocol, the pGL4.48[*luc2P*/SBE/Hygro] vector is used to measure activation of the SBE in HEK293 cells upon treatment with TGF-β1. In designing such experiments, it is important that the chosen cell type can be transfected efficiently and that it expresses the proper components of the signaling pathway of interest in order to generate the biological response. Protocol optimization may be required for your particular cell type and assay conditions.

### Materials to be Supplied by User

- Dulbecco's PBS (DPBS; Life Technologies Cat.# 14190)
- 0.05% Trypsin-EDTA (Life Technologies Cat.# 25300)
- DMEM (Life Technologies Cat.# 11995)
- Complete medium (DMEM supplemented with 10% fetal bovine serum [DMEM/FBS; Life Technologies Cat.# 16000] and 1X NEAA [Life Technologies Cat.# 11140])
- Opti-MEM® I (Life Technologies Cat.# 31985)
- FuGENE® HD Transfection Reagent (Cat.# E2311)
- Human TGF-β1 (Sigma Cat.# T7039-2UG)
- BSA (Sigma Cat.# B4287)
- ONE-Glo™ Luciferase Assay System (Cat.# E6120)
- HEK293 cells

### Day 1: Reverse Transfection

#### Preparation of Cells

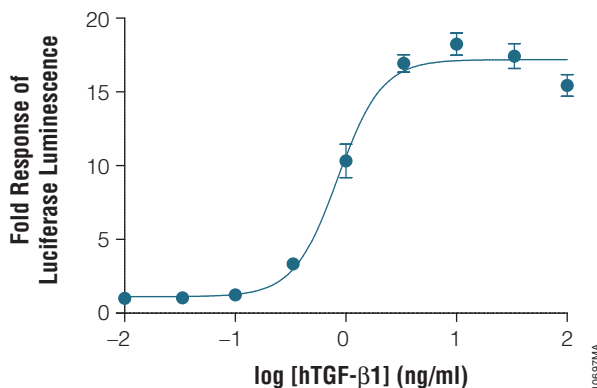
1. Grow HEK293 cells in complete medium [DMEM + 10% FBS + 1X NEAA]. Wash with DPBS and treat with one volume of 0.05% trypsin-EDTA. Resuspend cells in four volumes of complete medium.
2. Pellet the cells by centrifugation at 233 x *g* for 5 minutes in a swinging-bucket rotor. Resuspend in complete medium at a concentration of 2 × 10<sup>5</sup> cells/ml.

#### Preparation of Lipid:DNA Mixture

1. Dilute pGL4.48[*luc2P*/SBE/Hygro] DNA to 10ng DNA/μl in Opti-MEM® I.
2. Add FuGENE® HD to a 3:1 lipid:DNA ratio. Mix by pipetting. Incubate at room temperature for 30 minutes.
3. Dilute lipid:DNA mixture 20-fold with 2 × 10<sup>5</sup> cells/ml cell suspension. Mix by inversion.
4. Plate 100μl per well into a solid, white 96-well plate (Corning Cat.# 3917).
5. Incubate for 18 hours in a 37°C, 5% CO<sub>2</sub> incubator.

### Day 2: Cell Treatment and Luminescence Measurement

1. Resuspend human TGF-β1 (hTGF-β1) to 50μg/ml in water. Dilute 50X into DPBS + 2 mg/ml BSA to give a 1μg/ml solution, and then serially dilute into the same buffer to give 10X stocks.
2. Add 10μl of the 10X dilutions of hTGF-β1 to each well and incubate for 3 hours in a 37°C, 5% CO<sub>2</sub> incubator.
3. Remove plates from the 37°C, 5% CO<sub>2</sub> incubator and allow them to cool to room temperature for approximately 15 minutes.
4. Add ONE-Glo™ Luciferase Assay System detection reagent to each well and measure luminescence following the recommended protocol (Refer to the ONE-Glo™ Luciferase Assay System Technical Manual, #TM292 for details).



**Figure 1. Representative data for pGL4.48[*luc2P*/SBE/Hygro] in HEK293 cells upon stimulation with hTGF-β1.** HEK293 cells were transiently transfected with pGL4.48[*luc2P*/SBE/Hygro] and assayed in 96-well format after three hours stimulation with hTGF-β1 as indicated in the protocol. Firefly luciferase luminescence normalized to untreated cells is shown, with error bars indicating S.E.M. for three replicates. Luminescence was detected after addition of ONE-Glo® Reagent, using a GloMax® 96 instrument with a 0.5 second integration time.