



BMP Responsive Luciferase Reporter HEK293 Cell Line

(For Research Use Only)

HEK293--- Catalog Number: SL-0051

Introduction

Bone morphogenic protein (BMP) is involved in embryogenesis, development of many organ systems and adult tissue homeostasis. Smads (Smad1/5/8) are activated during the signal transduction and then form a complex with Smad4, translocate into the nucleus where they regulate expression of transcriptional factors and transcriptional coactivators.

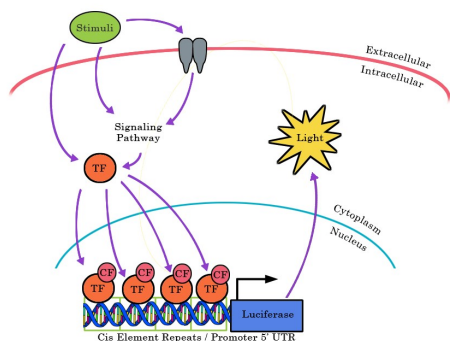
Deficiency in BMP production or functionality usually leads to marked defects or severe human diseases associated with most organ systems.

Monitoring the BMP activity is essential to research of the BMP signaling-associated diseases and conduct drug discovery.

Product description

Signosis has established a BMP Responsive Luciferase Reporter HEK293 Cell Line that has been stably transfected with pTA-BMP-luciferase reporter vector, which contains 4 repeats of BMP binding sites, a minimal promoter upstream of the firefly luciferase coding region.

Following selection, the hygromycin resistant clones were subsequently screened for BMP-induced luciferase activity. The clones with the highest fold induction was selected and expanded to produce the stable cell line. Therefore, the cell line can be used as a reporter system for monitoring the activation of BMP triggered by stimuli treatment, enforced gene expression and gene knockdown.



TF = Transcription Factor
CF = Co Factor

Materials provided

One vial of 2×10^6 cells, at passage 4, in Freezing Media. **IMPORTANT:** store the frozen cells in liquid nitrogen until you are ready to thaw and propagate them.

Handling cells upon arrival



It is strongly recommended that you propagate the cells by following instructions as soon as possible upon arrival.

IMPORTANT: It is imperative that an adequate number of frozen stocks be made from early passages as cells may undergo genotypic changes. Possible genetic instability in transfected cells may result in a decreased responsiveness over time in normal cell culture conditions.

Required Cell Culture Media

- **Complete Growth Media**
In 450mL of DMEM, add 50mL FBS (10% final) and 5mL Penicillin/Streptomycin (1% final).
- **Freezing Media**
Add 10% DMSO (final) to Complete Growth Media and sterile-filter. Make fresh each time.

Materials required but not provided (May be substituted with comparable third-party products):

Materials	Product number
Dulbecco's Modified Eagles Medium (DMEM)	Hyclone SH30243.01
Fetal Bovine Serum (FBS)	Fisherbrand P/N 03-600-511
Penicillin/Streptomycin	Hyclone P/N SV30010
Trypsin	Hyclone P/N SH30236.02
Phosphate-buffered saline (PBS)	Cellgro P/N 21-040-CV
DMSO	Sigma P/N D8418
96-well white plate	Greiner Bio-One P/N 655098
Luciferase substrate	Signosis P/N LUC015
Cell lysis buffer	Signosis P/N LS-001
Hygromycin B (OPTIONAL)	Toku-E P/N H010

Initial Culture Procedure

1. Quickly thaw cells in a 37°C water bath with careful agitation. Remove from bath as soon as the vial is thawed.
2. Transfer cells to a T-25cm² flask (or 60mm² dish) containing 5-10ml of **Complete Growth Media**.
3. Gently rock the flask to ensure the cells are mixed well in the media. **DO NOT PIPET**.
4. Place the flask with cells in a humidified incubator at 37°C with 5% CO₂.
5. After cells adhere (wait at least 4 hours to overnight), **replace media** with fresh **Complete Growth Media**.

Subculture Procedure

1. Subculture/passage cells when density reaches 90-100% confluency. **Optional: the cells can be maintained in Complete Growth Media with 50µg/ml of Hygromycin B.**
2. Carefully remove the culture media from cells by aspiration.
3. Rinse cells with PBS, being careful to not dislodge attached cells. Then remove PBS by aspiration.
4. Add 1-2 mL trypsin/Tris-EDTA solution.
5. Incubate with trypsin for 2-5 minutes (or until detached). Confirm detachment by observation under the microscope.
6. Add 5-10ml of pre-warmed Complete Growth Media and gently pipet up and down to break the clumps.
7. Passage cells in 1:3 to 1:5 ratio when they reach 90% confluency.

NOTE: Stable cell line may exhibit slower proliferation rate compared to parental cells. Do not seed cells at suboptimal density as this may hinder cell growth and division.

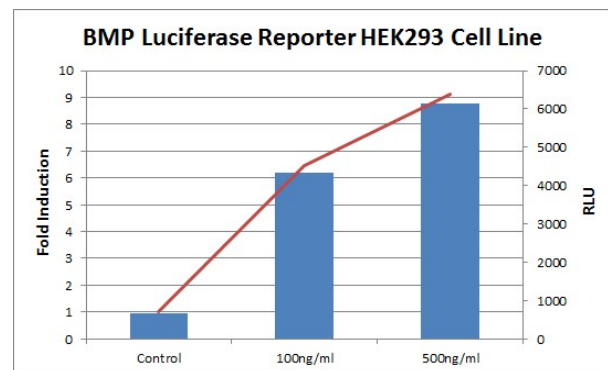
Preparing frozen stocks

This procedure is designed for 100mm² dish or T-75cm² flasks. Scale volumes accordingly to other vessels.

1. When cells reach 90-100% confluency, freeze down cells.
2. Detach cells according to "Subculture Procedure."
3. Transfer cells to a 15ml conical centrifuge tube and centrifuge at 250 x g (or 2,000 RPM) for 5 minutes to collect the cells into a pellet.
4. Carefully aspirate the media.
5. Add 1ml of **Freezing Media** and gently resuspend by pipetting up and down.
6. Transfer 1mL of cells into a cryogenic vial.
7. Place cryogenic vial in a freezing container (*Nalgene # 5100-0001*) and store at -80°C freezer overnight.
8. Transfer cells to liquid nitrogen for long term storage.

The following procedure should be followed as a guideline. You will need to optimize the assay conditions based upon your experimental set up.

1. The day before performing the assay, trypsinize the cells and seed each well of a 96-well **white-wall** plate with 1 x 10⁴ cells in 100µl.
2. Incubate the plate in a humidified incubator at 37°C with 5% CO₂ overnight.
3. Add inducing TBHQ in 0.1% FBS in DMEM directly to each well and incubate for 16 hours produce maximal induction.
4. Remove the media by aspiration and add 100µl of PBS to each well.
Note: Because HEK293 cells adherent to plate weakly, PBS wash step can be skipped
5. Remove PBS by aspiration and add 20µl of 1x lysis buffer to each well (Add one volume of 5x lysis buffer to four volume of distilled water to prepare 1x lysis buffer).
6. Incubate cells in lysis buffer for 15 minutes at room temperature.
7. Add 100µl of luciferase substrate to each well and gently pipette up and down.
8. Immediately read the plate in a luminometer.



Analysis of SL-0051 luciferase reporter activity in response to BMP treatment

The cells were seeded on a 96-well plate overnight in complete growth media. The cells were then treated with or without BMP in growth media with 0.1% FBS for 16 hours. The BMP Luciferase Reporter HEK293 Cell Line exhibits BMP dependent increase in luciferase activity when compared to untreated cells.

Signosis Luciferase Reporter Stable Cell Lines

Transcription Factors	Pathway	Cell Line	Catalog Number
NFkB	NFkB	Hela; human cervical cancer	SL-0001
NFkB	NFkB	NIH/3T3; mouse fibroblast	SL-0006
NFkB	NFkB	HEK293; human embryonic kidney	SL-0012
NFkB	NFkB	MCF-7; human breast cancer	SL-0013
NFkB	NFkB	A549; human lung cancer	SL-0014
NFkB	NFkB	HepG2; human liver cancer	SL-0017
NFkB	NFkB	Neuro2a; mouse neuroblastoma	SL-0026
NFkB	NFkB	MEF; murine embryonic fibroblast	SL-0033
NFAT	Calcium Signaling	Jurkat T; human T lymphocyte	SL-0032
NFAT	Calcium Signaling	Hela; human cervical cancer	SL-0018
NFAT	Calcium Signaling	NIH/3T3; mouse fibroblast	SL-0029
p53	p53	Hela; human cervical cancer	SL-0011
p53	p53	RKO; human colon cancer	SL-0007
SMAD	TGFbeta	HepG2; human liver cancer	SL-0016
SMAD	TGFbeta	NIH/3T3; mouse fibroblast	SL-0030
NRF2	Antioxidant Response	MCF7; human breast cancer	SL-0010
STAT1	JAK-STAT	Hela; human cervical cancer	SL-0004
STAT3	JAK-STAT	Hela; human cervical cancer	SL-0003
HIF	Hypoxia Response	NIH/3T3; mouse fibroblast	SL-0005
HIF	Hypoxia Response	Hela; human cervical cancer	SL-0023
HIF	Hypoxia Response	Neuro2a; mouse neuroblastoma	SL-0027
ER	Estrogen Receptor Signaling	T47D; human breast cancer	SL-0002
AR	Androgen Receptor Signaling	MDA-MB-453; human breast cancer	SL-0008
GR	Glucocorticoid Receptor Signaling	MDA-MB-453; human breast cancer	SL-0009
GR	Glucocorticoid Receptor Signaling	Hela; human cervical cancer	SL-0021
AP-1	JNK, ERK, MAPK Signaling	Hela; human cervical cancer	SL-0019
CREB	cAMP, PKA, CaMK Signaling	HEK293; human embryonic kidney	SL-0020
CREB	cAMP, PKA, CaMK Signaling	NIH/3T3; mouse fibroblast	SL-0031
CHOP	Unfolded Protein Response, ER stress	Mia-Paca2; human pancreatic cancer	SL-0025
TCF/LEF	Wnt/b-catenin	HEK293; human embryonic kidney	SL-0015
TCF/LEF	Wnt/b-catenin	Hela; human cervical cancer	SL-0022
TCF/LEF	Wnt/b-catenin	CHO-K1; Chinese Hamster Ovary	SL-0028
ELK	MAPK Signaling	HEK293; human embryonic kidney	SL-0040
ELK	MAPK Signaling	Hela; human cervical cancer	SL-0041
IRF	Immune Response Pathway	HEK293; human embryonic kidney	SL-0035