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## Thyroid Stimulating Hormone Receptor (TSHR) ACTOne™ Stable Cell Line

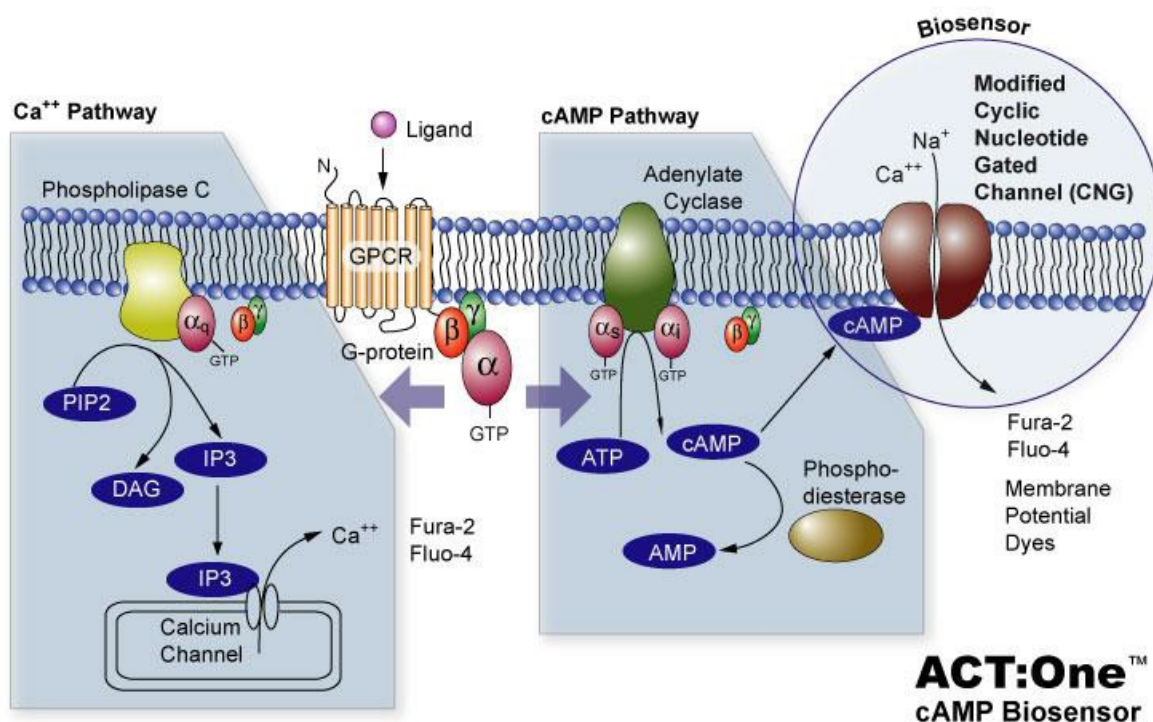
CATALOG NUMBER: CL-01-TSHR

### Introduction

TSHR is a member of the G protein-coupled receptor superfamily of integral membrane proteins and is coupled to the Gs protein. Upon binding circulating thyrotropin, a G-protein signal cascade activates adenylyl cyclase and intracellular levels of cAMP rise. cAMP activates all functional aspects of the thyroid cell, including iodine pumping; thyroglobulin synthesis, iodination, endocytosis and proteolysis; thyroid peroxidase activity; and hormone release.

### Description

Human TSHR ACTOne™ is a HEK-293 CNG cell line that expresses recombinant human TSHR. HEK-293 CNG cells express a modified CNG (Cyclic Nucleotide Gated) channel that opens in response to elevated intracellular cAMP levels and consequently result in ion flux (often detectable by calcium-responsive dye, Cat# CA-C155) and cell membrane depolarization which can be easily measured with fluorescent Membrane Potential Dye (Cat# CA-M165). The assay allows both end-point and kinetic measurement of intracellular cAMP changes with a FDSS, FLIPR, or a fluorescence microplate reader.



### Parental Cells

HEK-293 CNG cells (originally developed by BD Biosciences by introducing CNG in HEK-293 cells) (Cat# CL-03-PC20)

### Gene/Enzyme Introduced

TSHR (Genbank Accession No. AAR07906)



### Applications

- cAMP dependent human TSHR receptor cell based assay
- cell based high-throughput screening of human TSHR receptor agonists/antagonists

### Functional Test

- this cell line has been tested positive for TSHR receptor specific response
- surviving rate: More than 2.5 million/vial on the second day after thawing
- the receptor specific activity is stable for 10 weeks continuous passage

### Mycoplasma Contamination Test

This lot of cells has been tested and found to be free of mycoplasma contamination.

### Content

- Stable TSHR receptor cells: 1 mL ( $1 \times 10^6$  cells/mL in 70% DMEM, 20% FBS, 10% DMSO)

### Growth Properties

Adherent

### Cell Culture Medium

- Growth medium: DMEM-10% FBS supplemented with 250  $\mu$ g/ml G418, 1  $\mu$ g/ml Puromycin
- Freezing medium: 10% DMSO, 90% complete cell culture medium

### Subculturing Procedure

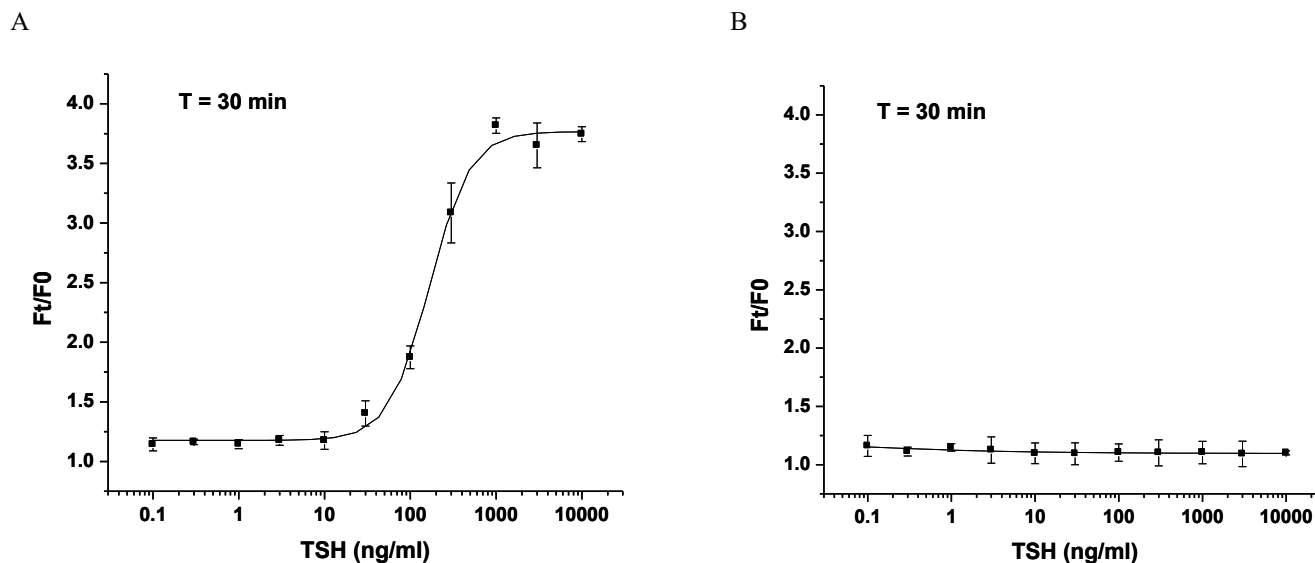
1. Thaw the frozen cryovial of cells within 1-2 min by gentle agitation in a 37°C water bath. Decontaminate the cryovial by wiping the surface of the vial with 70% ethanol and transfer into a 75 cm<sup>2</sup> flask with 20 ml of complete DMEM growth medium.
2. Remove and discard culture medium next day, and then add fresh DMEM complete medium.
3. Monitor cell density daily. Cells should be passaged (1:3) when the culture reaches 90% confluence. Expected cell yield is between  $1.5 \times 10^5$  and  $2 \times 10^5$  viable cells/cm<sup>2</sup>.
4. Add 2.0 to 3.0 mL of 0.25% (w/v) trypsin-0.53 mM EDTA solution to the flask and observe cells under an inverted microscope until the cell layer is dispersed (usually within 15 to 20 minutes).  
**Note:** To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Place at 37°C to facilitate dispersal.
5. Transfer cell suspension to a 15mL centrifuge tube and spin at approximately 250 x g for 5 to 10 minutes.
6. Discard supernatant and resuspend cells in fresh growth medium. Add appropriate aliquots of the cell suspension to new culture vessels. An inoculum of 4 to 6 x 10<sup>4</sup> viable cells/cm<sup>2</sup> is recommended.
7. Incubate cultures at 37°C (5% CO<sub>2</sub>).

### Storage

Remove the frozen cells from the dry ice packaging and immediately place the cells at a temperature below -130°C, preferably in liquid nitrogen vapor, until ready for use.



## Data Example



**Figure 1. Response of ACTOne™ TSHR cell line & parental cell line to TSH.**

ACTOne™ TSHR receptor cells and parental cells (Cat# CL-03-PC20) were plated overnight in 20  $\mu$ l culture medium on a 384 well Biocoat plate. The next day, cells were dye-loaded with 20  $\mu$ l/well of 1x Dye-loading solution (membrane potential dye kit, Cat# CA-M165). After 2 hours of incubation at room temperature, two readings were obtained prior to and 30 min after the addition of TSH. Ratios of the two readings (F/F<sub>0</sub>) are plotted in the figure.

- A. Dose response curve of TSH H in ACTOne™ TSHR cell line. EC<sub>50</sub> = 5.2 nM in the presence of PDE inhibitor Ro 20-1724.**
- B. Parental cells do not respond to TSH.**

## Notice to Purchaser

1. This cell line is to be used for research purposes only. It may not be transferred to third parties, resold, modified for resale, or used to manufacture commercial products or to provide a service to third parties without written approval of eEnzyme LLC.
2. Refer to the license agreement for details on the usage restrictions.



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