

**READY-TO-ASSAY™ CALCIUM-OPTIMIZED CELLS  
HUMAN RECOMBINANT  $\beta_1$  ADRENOCEPTOR**

<b>CATALOG NUMBER:</b>	HTS104F	<b>QUANTITY:</b>	1 vial, 1 mL
<b>LOT NUMBER:</b>		<b>CONCENTRATION:</b>	1 x 10 <sup>7</sup> viable cells/mL

**BACKGROUND:** Millipore's Ready-To-Assay™ Calcium-Optimized Cells are GPCR-expressing cell lines that are designed for simple, rapid calcium assays with no requirement for culturing cells. The user simply thaws the cells with maximal viability, dispenses into assay plates, and assays for calcium response the next day.

The Ready-To-Assay™ cells are derived from ChemiScreen™ calcium-optimized stable cell lines, which express the GPCR target of interest at high levels on the cell surface, in a host cell line containing high levels of the promiscuous G $\alpha$ 15 protein to couple the receptor to the calcium signaling pathway. The Ready-To-Assay™ cells are prepared by chemical treatment at a concentration optimized for effective growth arrest while maintaining high viability (>80%) after thawing and overnight plating. Pharmacological functionality of the Ready-To-Assay™ cells is identical to that of the originating GPCR cell line.

The endogenous catecholamines epinephrine and norepinephrine have profound effects on smooth muscle activity, cardiac function, carbohydrate and fat metabolism, hormone secretion, neurotransmitter release, and central nervous system actions. These activities are mediated by GPCRs belonging to two subfamilies, the  $\alpha$ - and  $\beta$ -adrenergic receptors (Bylund *et al.*, 1994). The three members of the  $\beta$ -adrenergic receptor family,  $\beta_1$ ,  $\beta_2$  and  $\beta_3$ , couple to G<sub>s</sub> to increase cAMP upon activation. In the heart, the  $\beta_1$  receptor constitutes 70-80% of the  $\beta$ -adrenergic receptors. Activation of cardiac  $\beta$ -adrenergic receptors, acutely increases heart rate, cardiac output, and cardiac automaticity, and chronically increases cardiac myocyte apoptosis. In failing hearts, the  $\beta_1$  subtype is downregulated and desensitized, probably as a result of increased catecholamine levels. As a result,  $\beta$ -adrenergic receptor antagonists ( $\beta$  blockers) are effective in the treatment of congestive heart failure and arrhythmia (Lohse *et al.*, 2003). Millipore's cloned human  $\beta_1$ -expressing cell line is made in the Chem-1 host cells, an adherent cell line that supports high levels of recombinant  $\beta_1$  expression on the cell surface and contains high levels of promiscuous G protein to couple the receptor to the calcium signaling pathway. The untreated human  $\beta_1$ -Chem-1 cell line and the Ready-To-Assay™ human  $\beta_1$  cells have equivalent EC50s for denopamine.

**APPLICATIONS:** Calcium flux assay

**SPECIFICATIONS:**

	EC50 for Denopamine (nM)	Maximum Signal (RFU)	Z'
Ready-To-Assay Cells	13.4	6153	0.75
Continuous Passage Cells	13.6	6992	0.79

**HOST CELLS:** Chem-1 an adherent cell line expressing a recombinant promiscuous G-protein.

**TRANSFECTION:** Full-length human ADRB1 cDNA encoding  $\beta_1$  (Accession Number: NM\_000684)

**PLATING MEDIA:**

DMEM with 4.5 g/L glucose and 4 mM glutamine (Millipore SLM-020-A)  
10% heat-inactivated FBS  
1x Nonessential amino acids (from 100x stock, Millipore TMS-001-C)  
10mM HEPES (from 1 M HEPES, Millipore TMS-003-C)  
100 U/mL Pen-Strep (from 100x stock, Millipore TMS-AB2-C)

- PRESENTATION:** Cells are frozen at  $1 \times 10^7$  cells/mL in DMEM/20% fetal bovine serum/100 U/ml penicillin and streptomycin/10% DMSO.
- STORAGE:** Place cells in liquid nitrogen immediately upon receipt. Maintain frozen in liquid nitrogen for up to 5 years.
- ASSAY PROTOCOL:**
- 1) Thaw cells rapidly by removing from liquid nitrogen and immediately immersing in a 37°C water bath. Immediately after ice has thawed, sterilize the exterior of the vial with 70% ethanol.
  - 2) Transfer contents of the vial to a sterile 15 mL conical tube. Add 10 mL prewarmed plating media to the cells and mix gently to resuspend cells. Centrifuge at 200 x g. Remove all but 0.5 mL media.
  - 3) Resuspend cells to  $0.5 \times 10^6$  cells/mL in plating media. Dispense the cell suspension into a 96-well assay plate at 200  $\mu$ L per well to obtain a density of approximately  $1 \times 10^5$  cells/well.
  - 4) Place the assay plate in a humidified 37°C incubator with 5% CO<sub>2</sub>.
  - 5) The cells may be assayed 16-24 hours after plating. It is recommended to wash the cells with assay buffer at least once prior to addition of loading dye.

**REFERENCES:** Bylund DB *et al.* (1994). IV. International Union of Pharmacology nomenclature of adrenoceptors. *Pharmacol. Rev.* 46: 121-136.

Lohse MJ *et al.* (2003) What is the role of  $\beta$ -adrenergic signaling in heart failure? *Circ. Res.* 93: 896-906.

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HUMAN RECOMBINANT  $\beta_1$  ADRENOCEPTOR**

**Product No. HTS104F**

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