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PRODUCT DATASHEET

ChemiScreen™ $S1P_2$ Lysophospholipid Receptor Stable Cell Line

CATALOG NUMBER: HTS078C

CONTENTS: 2 vials of mycoplasma-free cells, 1 mL per vial.

STORAGE: Vials are to be stored in liquid N_2.

BACKGROUND

ChemiScreen cell lines are constructed in the Chem-1 host, which supports high levels of functional receptor expression on the cell surface. Chem-1 cells contain high endogenous levels of Gα15, a promiscuous G protein, allowing most receptors to couple to the calcium signaling pathway.

Sphingosine 1-phosphate (S1P) is a bioactive lipid that binds to and activates a family of GPCRs, $S1P_{1-5}$ (also known as EDG receptors). Interactions between S1P and its receptors mediate cytoskeletal rearrangement and cell migration, with functional consequences in angiogenesis, lymphocyte trafficking, and smooth muscle development (Anliker and Chun, 2004). $S1P_1$ (Edg-1) signals exclusively through G_i, whereas $S1P_2$ (Edg-5) and $S1P_3$ (Edg-3) activate G_i, G_q and $G_{12/13}$ (Windh *et al.*, 1999). Although $S1P_1$ and $S1P_3$ promote cell migration, $S1P_2$ inhibits cell migration in several cell types; these opposing functions appear to result from differences in the ability of each receptor to activate G_i (Arikawa *et al*., 2003; Sugimoto *et al*., 2003; Goparaju *et al.*, 2005). Studies with knockout mice indicate that $S1P_2$ and $S1P_3$ have redundant functions in maintaining vascular integrity during embryonic development (Kono *et al*., 2004). The cloned human $S1P_2$-expressing cell line is made in the Chem-1 host, which supports high levels of recombinant $S1P_2$ expression on the cell surface and contains high levels of the promiscuous G protein Gα15 to couple the receptor to the calcium signaling pathway. Thus, the cell line is an ideal tool for screening for antagonists of interactions between $S1P_2$ and its ligands.

USE RESTRICTIONS

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WARNINGS

For Research Use Only; Not for Use in Diagnostic Procedures
Not for Animal or Human Consumption

GMO

This product contains genetically modified organisms.
Este producto contiene organismos genéticamente modificados.
Questo prodotto contiene degli organismi geneticamente modificati.
Dieses Produkt enthält genetisch modifizierte Organismen.
Ce produit contient organismes génétiquement des modifiés.
Dit product bevat genetisch gewijzigde organismen.
Tämä tuote sisältää geneettisesti muutettuja organismeja.
Denna produkt innehåller genetiskt ändrade organismer.

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APPLICATIONS

Calcium Flux Fluorescence Assay

APPLICATION DATA

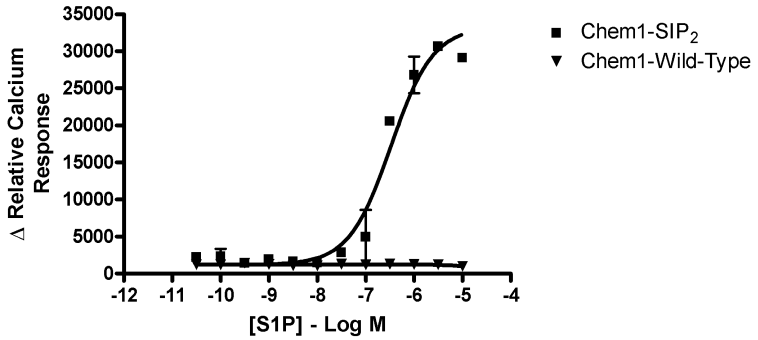

Figure 1. Representative data for activation of the $S1P_2$ receptor stably expressed in Chem-1 cells induced by S1P using a fluorescent calcium flux assay. $S1P_2$–expressing Chem-1 cells were seeded at 50,000 cells per well into a 96-well plate, and the following day the cells were loaded with a fluorescent calcium indicator. Calcium flux in response to the indicated ligand with a final concentration of 0.5% DMSO was determined on a Molecular Devices FLIPR^{TETRA}® with ICCD camera. Maximal fluorescence signal obtained in this experiment was 9,000 RLU. Similarly parental cells (catalog #: HTSCHEM-1) were tested to determine the specificity of the resulting signal.

Table 1. EC_{50} value of $S1P_2$-expressing Chem-1 cells.

LIGAND	ASSAY	POTENCY EC_{50} (nM)	REFERENCE
S1P	Calcium Flux - Fluorescence	300	Eurofins Internal Data

* The cell line was tested and found to have equivalent EC_{50} and signal at 1, 3 and 6 weeks of continuous culture by calcium flux fluorescence.

CELL CULTURE

Table 2. Recommended Cell Culture Reagents (not provided)

Description	Component	Concentration	Supplier and Product Number
Basal Medium	DMEM high glucose Medium (4.5g/L)	-	Hyclone: SH30022
	Fetal Bovine Serum (FBS)	10%	Hyclone: SH30070.03
	Non-Essential Amino Acids (NEAA)	1X	Hyclone: SH30238.01
	HEPES	1X	EMD Millipore: TMS-003-C
Selection Medium	Basal Medium (see above)	-	
	Geneticin (G418)	250 µg/ml	Invivogen: ant-gn-5
Dissociation	Sterile PBS	-	Hyclone: SH30028.03
	0.25% Trypsin-EDTA	-	Hyclone: SH30042.01
CryoMedium	Basal Medium (see above)	40%	
	Fetal Bovine Serum (FBS)	50%	Hyclone: SH30070.03
	Dimethyl Sulfoxide (DMSO)	10%	Sigma: D2650

Cell Handling

1. Upon receipt, directly place cells in liquid nitrogen storage. Consistent cryopreservation is essential for culture integrity.
2. Prepare Basal Medium. Prepare 37ºC Water Bath. Thaw cells rapidly by removing from liquid nitrogen, and immediately immersing in a 37ºC water bath, until 90% thawed. Immediately sterilize the exterior of the vial with 70% ethanol.
3. Add vial contents to 15 mL Basal Medium in T75 Tissue Culture Treated Flask. Gently swirl flask and place in a humidified, tissue culture incubator, 37ºC, 5% CO_2.
4. 18-24 Hours Post–Thaw, all live cells should be attached. Viability of the cells is expected to be 60-90%, At this time, exchange Basal Medium with Selection Medium.
5. When cells are approximately 80% confluent, passage the cells. It is suggested that user expand culture to create >20 vial Master Cell Bank at low passage number. *Cells should be maintained at less than 80% confluency for optimal assay results.*
6. Cell Dissociation: Aspirate Culture Medium. Gently wash with 1x Volume PBS. Add 0.1x Volume Warm Trypsin-EDTA. Incubate 4 min, 37°C, until cells dislodge. *If cells do not round up, place in 37º C incubator for additional 2 min*. Neutralize Trypsin and collect cells in 1x Volume Basal Medium.
7. Seed Cells for expansion of culture. It is recommended that cell lines are passaged at least once before use in assays.

Table 3. Cell Culture Seeding Suggestions: *User should define based on research needs.*

Flask Size (cm^2)	Volume (mL)	Total Cell Number ($x10^6$)	Growth Period (hrs)
T75	15	5.0	24
T75	15	2.0	48
T75	15	0.45	72

ASSAY SETUP

Fluorescence

Table 4. Settings for FLIPR^{TETRA}® with ICCD camera option

Option	Setting
Read Mode	Fluorescence
Ex/Em	Ex470_495 / Em515_575
Camera Gain	2000
Gate Open	6 %
Exposure Time	0.53
Read Interval	1s
Dispense Volume	50 µl (25 µl for 384-well)
Dispense Height	95 µl (50 µl for 384-well)
Dispense Speed	50 µl/sec
Expel Volume	0 µl
Analysis	Subtract Bias Sample 1

Table 5. Assay Materials (Not provided)

Description	Supplier and Product Number
HBSS	Invitrogen: 14025
HEPES 1M Stock	EMD Millipore: TMS-003-C
Probenicid	Sigma: P8761
Quest Fluo-8™, AM	AAT Bioquest: 21080
S1P ligand	Sigma: S9666
Non-Binding 96/384 well Plates (for ligand prep)	Corning: 3605/ 3574
Black (clear Bottom) cell assay plates	Corning: 3904/ 3712
Coelenterazine-h (250µg). Prepare to 10mM	Promega: S2011

Assay Protocol – Fluorescence

1. Dissociate Culture as Recommended. Collect in Basal Medium. Document Cell Count and Viability
2. Centrifuge the cell suspension at 190 x g for six min
3. Remove supernatant. Gently resuspend the cell pellet in Basal Medium. *It is suggested that end user optimize cell plating based on individual formats.* (Default: Resuspend in volume to achieve $5x10^5$cells/ml *(i.e, if collected 5e6 TC,* $^{5e6/}_{5e5/ml}$ *=10 mL volume)*
4. Seed cell suspension into black, clear bottom plate (100 µL/well for 96-well plate). *When seeding is complete, place the assay plate at room temperature for 30 min.*
5. Move assay plate to a humidified 37ºC 5% CO_2 incubator for 18-24 h.
6. Next day, prepare Assay buffer (HBSS, 20mM HEPES, 2.5 mM Probenicid, pH 7.4) and Loading buffer (Assay buffer with 5 mM Fluo8 Dye). *Note: Please prepare Fluo8 stock according to Manufacturer's Recommendations*
7. Remove medium from assay plate and wash 1X with Assay Buffer.
8. Add Loading buffer to assay plate (100 µL/well for 96-well plate). Incubate plate for 1.5 h at room temperature, protected from light.
9. Prepare ligands in assay buffer at 3x final concentration in non-binding plates. Use Buffer Only Control Wells for Background Subtraction.
10. Create protocol for ligand addition. Please refer to FLIPR^{TETRA}® settings provided in Table 2. Set time course for 180 s, with ligand addition at 10 s.
11. After the run is complete, apply subtract bias on sample 1. We recommend using Negative Control Correction with Buffer Only Wells. Export data to according to research needs. For most Calcium Flux analysis using Export of Max Signal to end of run is sufficient.

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HOST CELL

Chem-1, an adherent cell line expressing the promiscuous G-protein, Gα15.

EXOGENOUS GENE EXPRESSION

Human $S1P_2$ cDNA (Accession Number: NM_004230; see CODING SEQUENCE below) and promiscuous G protein are expressed in a bicistronic vector

CODING SEQUENCE

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   1 - ATG GGC AGC TTG TAC TCG GAG TAC CTG AAC CCC AAC AAG GTC CAG GAA CAC TAT AAT TAT ACC AAG GAG ACG  - 72
   1 -  M   G   S   L   Y   S   E   Y   L   N   P   N   K   V   Q   E   H   Y   N   Y   T   K   E   T  - 24

  73 - CTG GAA ACG CAG GAG ACG ACC TCC CGC CAG GTG GCC TCG GCC TTC ATC GTC ATC CTC TGT TGC GCC ATT GTG  - 144
  25 -  L   E   T   Q   E   T   T   S   R   Q   V   A   S   A   F   I   V   I   L   C   C   A   I   V  - 48

 145 - GTG GAA AAC CTT CTG GTG CTC ATT GCG GTG GCC CGA AAC AGC AAG TTC CAC TCG GCA ATG TAC CTG TTT CTG  - 216
  49 -  V   E   N   L   L   V   L   I   A   V   A   R   N   S   K   F   H   S   A   M   Y   L   F   L  - 72

 217 - GGC AAC CTG GCC GCC TCC GAT CTA CTG GCA GGC GTG GCC TTC GTA GCC AAT ACC TTG CTC TCT GGC TCT GTC  - 288
  73 -  G   N   L   A   A   S   D   L   L   A   G   V   A   F   V   A   N   T   L   L   S   G   S   V  - 96

 289 - ACG CTG AGG CTG ACG CCT GTG CAG TGG TTT GCC CGG GAG GGC TCT GCC TTC ATC ACG CTC TCG GCC TCT GTC  - 360
  97 -  T   L   R   L   T   P   V   Q   W   F   A   R   E   G   S   A   F   I   T   L   S   A   S   V  - 120

 361 - TTC AGC CTC CTG GCC ATC GCC ATT GAG CGC CAC GTG GCC ATT GCC AAG GTC AAG CTG TAT GGC AGC GAC AAG  - 432
 121 -  F   S   L   L   A   I   A   I   E   R   H   V   A   I   A   K   V   K   L   Y   G   S   D   K  - 144

 433 - AGC TGC CGC ATG CTT CTG CTC ATC GGG GCC TCG TGG CTC ATC TCG CTG GTC CTC GGT GGC CTG CCC ATC CTT  - 504
 145 -  S   C   R   M   L   L   L   I   G   A   S   W   L   I   S   L   V   L   G   G   L   P   I   L  - 168

 505 - GGC TGG AAC TGC CTG GGC CAC CTC GAG GCC TGC TCC ACT GTC CTG CCT CTC TAC GCC AAG CAT TAT GTG CTG  - 576
 169 -  G   W   N   C   L   G   H   L   E   A   C   S   T   V   L   P   L   Y   A   K   H   Y   V   L  - 192

 577 - TGC GTG GTG ACC ATC TTC TCC ATC ATC CTG TTG GCC ATC GTG GCC CTG TAC GTG CGC ATC TAC TGC GTG GTC  - 648
 193 -  C   V   V   T   I   F   S   I   I   L   L   A   I   V   A   L   Y   V   R   I   Y   C   V   V  - 216

 649 - CGC TCA AGC CAC GCT GAC ATG GCC GCC CCG CAG ACG CTA GCC CTG CTC AAG ACG GTC ACC ATC GTG CTA GGC  - 720
 217 -  R   S   S   H   A   D   M   A   A   P   Q   T   L   A   L   L   K   T   V   T   I   V   L   G  - 240

 721 - GTC TTT ATC GTC TGC TGG CTG CCC GCC TTC AGC ATC CTC CTT CTG GAC TAT GCC TGT CCC GTC CAC TCC TGC  - 792
 241 -  V   F   I   V   C   W   L   P   A   F   S   I   L   L   L   D   Y   A   C   P   V   H   S   C  - 264

 793 - CCG ATC CTC TAC AAA GCC CAC TAC TTT TTC GCC GTC TCC ACC CTG AAT TCC CTG CTC AAC CCC GTC ATC TAC  - 864
 265 -  P   I   L   Y   K   A   H   Y   F   F   A   V   S   T   L   N   S   L   L   N   P   V   I   Y  - 288

 865 - ACG TGG CGC AGC CGG GAC CTG CGG CGG GAG GTG CTT CGG CCG CTG CAG TGC TGG AGG CCG GGG GTG GGG GTG  - 936
 289 -  T   W   R   S   R   D   L   R   R   E   V   L   R   P   L   Q   C   W   R   P   G   V   G   V  - 312

 937 - CAA GGA CGG AGG CGG GGC GGG ACC CCG GGC CAC CAC CTC CTG CCA CTC CGC AGC TCC AGC TCC CTG GAG AGG  - 1008
 313 -  Q   G   R   R   R   G   G   T   P   G   H   H   L   L   P   L   R   S   S   S   S   L   E   R  - 336

1009 - GGC ATG CAC ATG CCC ACG TCA CCC ACG TTT CTG GAG GGC AAC ACG GTG GTC TGA
 337 -  G   M   H   M   P   T   S   P   T   F   L   E   G   N   T   V   V Stp
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RELATED PRODUCTS

Product Number	Description
HTSCHEM-1	ChemiScreen™ Chem-1 Parental Cell Line (control cells)
HTS078M	ChemiScreen™ $S1P_2$ Lysophospholipid Receptor Membrane Prep

REFERENCES

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2. Arikawa K et al. (2003) Ligand-dependent Inhibition of B16 Melanoma Cell Migration and Invasion via Endogenous S1P2 G Protein-coupled Receptor. J. Biol. Chem. 278: 32841-32851.
3. Goparaju SK et al. (2005) The S1P2 Receptor Negatively Regulates Platelet-Derived Growth Factor-Induced Motility and Proliferation. Mol. Cell. Biol. 25: 4237-4249.
4. Kono M et al. (2004) The Sphingosine-1-phosphate Receptors S1P1, S1P2, and S1P3 Function Coordinately during Embryonic Angiogenesis. J. Biol. Chem. 279: 29367-29373.
5. Sugimoto N et al. (2003) Inhibitory and Stimulatory Regulation of Rac and Cell Motility by the G12/13-Rho and Gi Pathways Integrated Downstream of a Single G Protein-Coupled Sphingosine-1-Phosphate Receptor Isoform. Mol. Cell. Biol. 23: 1534-1545.
6. Windh RT et al. (1999) Differential Coupling of the Sphingosine 1-Phosphate Receptors Edg-1, Edg-3, and H218/Edg-5 to the Gi, Gq, and G12 Families of Heterotrimeric G Proteins. J. Biol. Chem. 274: 27351-27358.

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