eurofins | Discovery Services

PRODUCT DATASHEET

ChemiScreen™ 5-HT$_{2A}$ Serotonin Receptor Stable Cell Line

CATALOG NUMBER: HTS082C

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.

5-Hydroxytryptamine (5-HT, also commonly known as serotonin) is synthesized in enterochromaffin cells in the intestine and in serotonergic nerve terminals. In the periphery, 5-HT mediates gastrointestinal motility, platelet aggregation, and contraction of blood vessels. Many functions of the central nervous system are influenced by 5-HT, including sleep, motor activity, sensory perception, arousal and appetite. A family of 12 GPCRs and one ion channel mediate the biological effects of 5-HT (Hoyer *et al.*, 1994). 5-HT$_{2A}$, which couples to G$_{q/11}$ to increase intracellular calcium, is widely expressed at central and peripheral sites of 5-HT action, and contributes to many of the physiological effects of 5-HT. The hallucinogenic activity of LSD is mediated in part by its action as an partial to full agonist at 5-HT$_{2A}$, and the activity of atypical antipsychotics such as clozapine appears to be mediated in part by antagonism of 5-HT$_{2A}$ (Barnes and Sharp, 1999). The cloned human 5-HT$_{2A}$ -expressing cell line is made in the Chem-1 host, which supports high levels of recombinant 5-HT$_{2A}$ 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 5-HT$_{2A}$ and its ligands.

USE RESTRICTIONS

Please see **Limited Use Label License Agreement** (Label License Agreement) for further details.

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

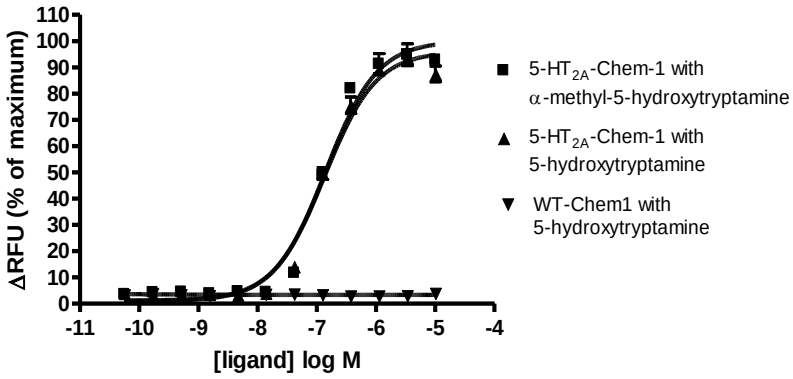

Figure 1. Representative data for activation of 5-HT_{2A} receptor stably expressed in Chem-1 cells induced by α-methyl-5-hydroxytryptamine using a fluorescent calcium flux assay. 5-HT_{2A} –expressing Chem-1 cells were seeded at 50,000 cells per well into a 96-well plate, and the following day the cells 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 7,000 RLU. Similarly parental cells (catalog #: HTSCHEM-1) were tested to determine the specificity of the resulting signal.

Table 1. EC_{50} value of 5-HT_{2A} -expressing Chem-1 cells.

LIGAND	ASSAY	POTENCY EC_{50} (nM)	REFERENCE
α-methyl-5-hydroxytryptamine	Calcium Flux - Fluorescence	141	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	0.75	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
α-methyl-5-hydroxytryptamine ligand	Tocris: 0557
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.

HOST CELL

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

EXOGENOUS GENE EXPRESSION

Human 5-HT_{2A} cDNA (Accession Number: NM_000621; see CODING SEQUENCE below) and promiscuous G protein expressed in a bicistronic vector

CODING SEQUENCE

```
                                                ATG GAT ATT CTT TGT GAA GAA AAT ACT TCT TTG
                                                 M   D   I   L   C   E   E   N   T   S   L

AGC TCA ACT ACG AAC TCC CTA ATG CAA TTA AAT GAT GAC ACC AGG CTC TAC AGT AAT GAC TTT AAC TCT
 S   S   T   T   N   S   L   M   Q   L   N   D   D   T   R   L   Y   S   N   D   F   N   S

GGA GAA GCT AAC ACT TCT GAT GCA TTT AAC TGG ACA GTC GAC TCT GAA AAT CGA ACC AAC CTT TCC TGT
 G   E   A   N   T   S   D   A   F   N   W   T   V   D   S   E   N   R   T   N   L   S   C

GAA GGG TGC CTC TCA CCG TCG TGT CTC TCC TTA CTT CAT CTC CAG GAA AAA AAC TGG TCT GCT TTA CTG
 E   G   C   L   S   P   S   C   L   S   L   L   H   L   Q   E   K   N   W   S   A   L   L

ACA GCC GTA GTG ATT ATT CTA ACT ATT GCT GGA AAC ATA CTC GTC ATC ATG GCA GTG TCC CTA GAG AAA
 T   A   V   V   I   I   L   T   I   A   G   N   I   L   V   I   M   A   V   S   L   E   K

AAG CTG CAG AAT GCC ACC AAC TAT TTC CTG ATG TCA CTT GCC ATA GCT GAT ATG CTG CTG GGT TTC CTT
 K   L   Q   N   A   T   N   Y   F   L   M   S   L   A   I   A   D   M   L   L   G   F   L

GTC ATG CCC GTG TCC ATG TTA ACC ATC CTG TAT GGG TAC CGG TGG CCT CTG CCG AGC AAG CTT TGT GCA
 V   M   P   V   S   M   L   T   I   L   Y   G   Y   R   W   P   L   P   S   K   L   C   A

GTC TGG ATT TAC CTG GAC GTG CTC TTC TCC ACG GCC TCC ATC ATG CAC CTC TGC GCC ATC TCG CTG GAC
 V   W   I   Y   L   D   V   L   F   S   T   A   S   I   M   H   L   C   A   I   S   L   D

CGC TAC GTC GCC ATC CAG AAT CCC ATC CAC CAC AGC CGC TTC AAC TCC AGA ACT AAG GCA TTT CTG AAA
 R   Y   V   A   I   Q   N   P   I   H   H   S   R   F   N   S   R   T   K   A   F   L   K

ATC ATT GCT GTT TGG ACC ATA TCA GTA GGT ATA TCC ATG CCA ATA CCA GTC TTT GGG CTA CAG GAC GAT
 I   I   A   V   W   T   I   S   V   G   I   S   M   P   I   P   V   F   G   L   Q   D   D

TCG AAG GTC TTT AAG GAG GGG AGT TGC TTA CTC GCC GAT GAT AAC TTT GTC CTG ATC GGC TCT TTT GTG
 S   K   V   F   K   E   G   S   C   L   L   A   D   D   N   F   V   L   I   G   S   F   V

TCA TTT TTC ATT CCC TTA ACC ATC ATG GTG ATC ACC TAC TTT CTA ACT ATC AAG TCA CTC CAG AAA GAA
 S   F   F   I   P   L   T   I   M   V   I   T   Y   F   L   T   I   K   S   L   Q   K   E

GCT ACT TTG TGT GTA AGT GAT CTT GGC ACA CGG GCC AAA TTA GCT TCT TTC AGC TTC CTC CCT CAG AGT
 A   T   L   C   V   S   D   L   G   T   R   A   K   L   A   S   F   S   F   L   P   Q   S

TCT TTG TCT TCA GAA AAG CTC TTC CAG CGG TCG ATC CAT AGG GAG CCA GGG TCC TAC ACA GGC AGG AGG
 S   L   S   S   E   K   L   F   Q   R   S   I   H   R   E   P   G   S   Y   T   G   R   R

ACT ATG CAG TCC ATC AGC AAT GAA CAA AAG GCA TGC AAG GTG CTG GGC ATC GTC TTC TTC CTG TTT GTG
 T   M   Q   S   I   S   N   E   Q   K   A   C   K   V   L   G   I   V   F   F   L   F   V

GTG ATG TGG TGC CCT TTC TTC ATC ACA AAC ATC ATG GCC GTC ATC TGC AAA GAG TCC TGC AAT GAG GAT
 V   M   W   C   P   F   F   I   T   N   I   M   A   V   I   C   K   E   S   C   N   E   D

GTC ATT GGG GCC CTG CTC AAT GTG TTT GTT TGG ATC GGT TAT CTC TCT TCA GCA GTC AAC CCA CTA GTC
 V   I   G   A   L   L   N   V   F   V   W   I   G   Y   L   S   S   A   V   N   P   L   V

TAC ACA CTG TTC AAC AAG ACC TAT AGG TCA GCC TTT TCA CGG TAT ATT CAG TGT CAG TAC AAG GAA AAC
 Y   T   L   F   N   K   T   Y   R   S   A   F   S   R   Y   I   Q   C   Q   Y   K   E   N

AAA AAA CCA TTG CAG TTA ATT TTA GTG AAC ACT ATA CCG GCT TTG GCC TAC AAG TCT AGC CAA CTT CAA
 K   K   P   L   Q   L   I   L   V   N   T   I   P   A   L   A   Y   K   S   S   Q   L   Q

ATG GGA CAA AAA AAG AAT TCA AAG CAA GAT GCC AAG ACA ACA GAT AAT GAC TGC TCA ATG GTT GCT CTA
 M   G   Q   K   K   N   S   K   Q   D   A   K   T   T   D   N   D   C   S   M   V   A   L

GGA AAG CAG CAT TCT GAA GAG GCT TCT AAA GAC AAT AGC GAC GGA GTG AAT GAA AAG GTG AGC TGT GTG
 G   K   Q   H   S   E   E   A   S   K   D   N   S   D   G   V   N   E   K   V   S   C   V

TGA
Stp
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RELATED PRODUCTS

Product Number	Description
HTSCHEM-1	ChemiScreen™ Chem-1 Parental Cell Line (control cells)
HTS082M	ChemiScreen™ 5-HT_{2A} Serotonin Receptor Membrane Prep

REFERENCES

1. Barnes NM and Sharp T (1999) A review of central 5-HT receptors and their function. *Neuropharmacology*, 38, 1083-1152.

2. Hoyer D *et al.* (1994) International Union of Pharmacology classification of receptors for 5-hydroxytryptamine (Serotonin). *Pharmacol. Rev.* 46: 157 - 203.

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