



Human Stem Cell Marker cDNA Plate Array

Catalog Number AP-0181

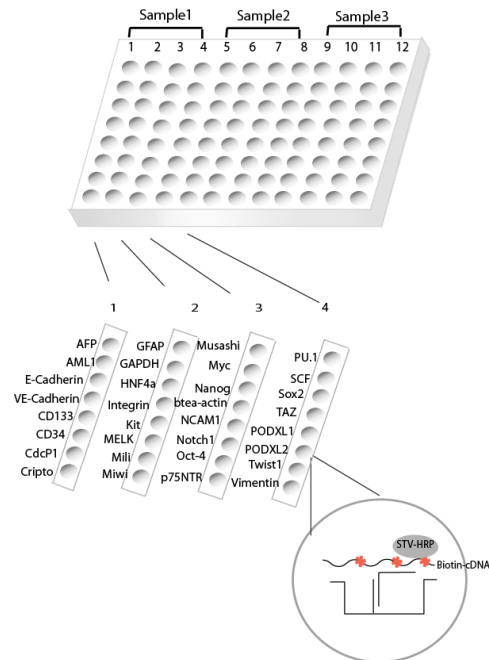
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Introduction

Stem cells have important characteristics distinguishing from other cell types. They are unspecialized cells capable of renewing themselves through cell division and differentiating into a variety of cell lineages. In addition, they serve as an internal repair system, replenishing specialized cells, in order to maintain the normal turnover of regenerative organs. Identification of a set of stem cell –specific genes can function as stem cell molecular marker to facilitate stem cell research. Signosis' Stem cell cDNA Plate Array allows profiling 30+ related genes.

Principle of the assay

Signosis' proprietary cDNA plate array is a plate-based hybridization profiling analysis for monitoring the expression of dozens of genes through reverse transcription of mRNA into cDNA. Like array analyses, total RNA is first reverse transcribed into cDNA in the presence of biotin-dUTP in the assay. Targeted genes are then specifically captured onto individual wells on a plate, instead of membranes, through a pre-coated gene-specific oligonucleotide. The captured cDNAs are further detected with streptavidin-HRP. Luminescence is reported as relative light units (RLUs) on a microplate luminometer. The expression level of genes is directly proportional to the luminescent intensity.



Chemiluminescence detection with a plate reader

Diagram of human stem cell marker cDNA plate array

Materials provided with the kit

- A 96-well plate coated with 31+ different capture oligos (RT)
- Human Stem Cell Primer Mix (-20 °C)
- Reverse transcription buffer mix (-20 °C)
- Reverse transcriptase RT (-20 °C)
- Streptavidin-HRP conjugate (4 °C)
- Plate hybridization buffer (RT)
- 5x Plate hybridization wash buffer (RT)
- Blocking buffer (RT)
- 5xDetection wash buffer (RT)
- Substrate A (4 °C)
- Substrate B (4 °C)
- Substrate dilution buffer (4 °C)

Material required but not provided

- PCR machine
- Incubator
- 0.2ml PCR tube
- luminometer plate reader
- ddH₂O (RNAase free)

Reagent preparation before starting experiment

- Dilute 30ml of 5x Plate hybridization wash buffer with 120 ml of dH₂O before use.
- Dilute 40ml of 5x Detection wash buffer with 160 ml of dH₂O before use.
- Warm up Plate hybridization buffer and Hybridization wash buffer at 45 °C until no visible precipitate before use. Stir the solution with 10ml or 5ml pipette to facilitate the dissolving process.
- Dilute 500 times of streptavidin-HRP with blocking buffer before use.

Assay procedure

1. cDNA synthesis using PCR machine

Note: Briefly spin tubes before opening

- (1) Sample preparation
 - X μ l 1-10 μ g total RNA
 - 2 μ l Human Stem Cell Primer Mix
 - X μ l ddH₂O

11 μ l
- (2) Incubate for 5 minutes at 65 °C, and chill on ice.
- (3) Add 8 μ l Reverse transcription buffer mix and 1 μ l RT to each reaction tube, and incubate for 1 hour at 45 °C.
- (4) Heat the reaction to 98 °C for 5 minutes, and chill on ice.
- (5) The 20 μ l cDNA is synthesized and labeled with biotin and ready for hybridization on the plate.

2. Plate hybridization

- (1) Remove the sealing film
- (2) Arrange the appropriate number of the wells of the plate based on your experiment. The whole plate is divided into 3 repeat sections, Column 1-4, 5-8, 9-12 for 3 different samples.
- (3) Mix 20 μ l cDNA with 3.5ml pre-warmed Plate hybridization buffer, and dispense 95 μ l mixture to each well in a section **immediately**. A reagent reservoir can be used for dispensing cDNA mixture into the wells with a 8 multichannel pipette.
- (4) Seal the wells with foil film securely and hybridize at 45 °C for overnight. Ensure the numbers and letters on the plate are clearly visible from under foil seal by pressing the foil down on every single experimental well. *Put an open container with water in the incubator to keep humidity and prevent evaporation from experimental wells.*

3. Plate detection

- (1) Remove the foil film from the experimental wells with a blade. Keep the unused well sealed.
- (2) Invert the Hybridization Plate over an appropriate container and expel the contents forcibly, and wash the plate 3 times by adding 200 μ l of pre-warmed 1x Plate hybridization wash buffer to each well. At each wash, incubate the plate for 5 minutes with gently shaking at room temperature.

- (3) Complete removal of liquid at each wash by firmly tapping the plate against clean paper towels.
- (4) Add 200 μ l of Blocking buffer to each well and incubate for 15 minutes at room temperature with gently shaking.
- (5) Invert the plate over an appropriate container to remove block buffer.
- (6) Add 20 μ l of streptavidin-HRP conjugate in 10ml blocking buffer (1:500) dilution, enough for one plate. Add 95 μ l of diluted streptavidin-HRP conjugate to each well and incubate for 45 min at room temperature with gently shaking.
- (7) Wash the plate 3 times by adding 200 μ l 1X Detection wash buffer to each well, At each wash, incubate the plate for 10 minutes with gently shaking at room temperature.
- (8) Complete removal of liquid at each wash by firmly tapping the plate against clean paper towels. At the last wash, invert plate on clean paper towels for 1-2 min to remove excessive liquid.
- (9) Freshly prepare the substrate solution:
 - For the whole plate:
 - 1ml Substrate A
 - 1ml Substrate B
 - 8ml Substrate dilution buffer
- (10) Add 95 μ l substrate solution to each well and incubate for 1 min.
- (11) Place the plate in the luminometer. Allow plate to sit inside machine for 5 min before reading. Set integration time to 1 second with no filter position. For the best results, read the plate within 5-20 minutes.

Diagram of human stem cell marker cDNA plate array

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|-------------|-------------|------------|----------|-------------|-------------|------------|----------|-------------|-------------|------------|----------|
| A | AFP | GFAP | Musashi | PU.1 | AFP | GFAP | Musashi | PU.1 | AFP | GFAP | Musashi | PU.1 |
| B | AML1 | GAPDH | Myc | SCF | AML1 | GAPDH | Myc | SCF | AML1 | GAPDH | Myc | SCF |
| C | E-Cadherin | HNF4a | Nanog | Sox2 | E-Cadherin | HNF4a | Nanog | Sox2 | E-Cadherin | HNF4a | Nanog | Sox2 |
| D | VE-Cadherin | Integrin b1 | Beta-actin | TAZ | VE-Cadherin | Integrin b1 | Beta-actin | TAZ | VE-Cadherin | Integrin b1 | Beta-actin | TAZ |
| E | CD133 | Kit | NCAM1 | PODXL1 | CD133 | Kit | NCAM1 | PODXL1 | CD133 | Kit | NCAM1 | PODXL1 |
| F | CD34 | MELK | Notch1 | PODXL2 | CD34 | MELK | Notch1 | PODXL2 | CD34 | MELK | Notch1 | PODXL2 |
| G | CdcP1 | Mili | Oct-4 | Twist1 | CdcP1 | Mili | Oct-4 | Twist1 | CdcP1 | Mili | Oct-4 | Twist1 |
| H | Cripto | Miwi | p75NTR | Vimentin | Cripto | Miwi | p75NTR | Vimentin | Cripto | Miwi | p75NTR | Vimentin |