ATCC

Product Sheet

ATCC-CYS0105 Human Induced Pluripotent Stem Cells (ATCC® ACS-1021™)

Please read this FIRST

Storage Temp.
liquid nitrogen vapor phase (-130°C or colder)

Biosafety Level
2

Intended Use

This product is intended for research use only. It is not intended for any animal or human therapeutic or diagnostic use.
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Citation of Strain

If use of this culture results in a scientific publication, it should be cited in that manuscript in the following manner: ATCC-CYS0105 Human Induced Pluripotent Stem Cells (ATCC® ACS-1021™)

American Type Culture Collection
PO Box 1549
Manassas, VA 20108 USA
www.atcc.org

800-638-6597 (US, Canada, Puerto Rico)
Tel: 703-365-2700
Fax: 703-365-2750
Tech@atcc.org

Description

ATCC-CYS0105 Human Induced Pluripotent Stem Cells (iPSCs) were derived from primary cardiac fibroblasts obtained from a healthy donor. Fibroblasts were reprogrammed by the expression of *OCT4, SOX2, KLF4* and *MYC* gene sequences using sendai viral transduction. This cell line provides a unique model system for better understanding cardiac development and differentiation, as well as source material for the development of iPSC-derived cardiocytes.
Cell Type: sendai virus reprogammed hiPSC
Reprogramming Method: Sendai viral expression of *OCT4, SOX2, KLF4* and *MYC* genes
Disease: normal
Gender: male
Age: 72 years
Isolation Date: 2012
Source: ATCC-CYS0105 Human Induced Pluripotent Stem Cells (iPSCs) were derived from primary cardiac fibroblasts obtained from a healthy donor.
Number of Colonies per Vial: ≥ 30 colonies after 5 days when seeded as directed

Batch-Specific Information

Refer to the Certificate of Analysis for batch-specific test results.

SAFETY PRECAUTION

ATCC highly recommends that protective gloves and clothing always be used and a full face mask always be worn when handling frozen vials. It is important to note that some vials leak when submersed in liquid nitrogen and will slowly fill with liquid nitrogen. Upon thawing, the conversion of the liquid nitrogen back to its gas phase may result in the vessel exploding or blowing off its cap with dangerous force creating flying debris.

Unpacking & Storage Instructions

1. Check all containers for leakage or breakage.
2. 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.

Handling Procedure for Frozen Cells

To insure the highest level of viability, thaw the vial and initiate the culture as soon as possible upon receipt. If, upon arrival, continued storage of the frozen culture is necessary, it should be stored in liquid nitrogen vapor phase and not at –80°C. Storage at –80°C will result in loss of viability.

Preparation for Culture

1. *Night before thawing iPSC cells* – Thaw CellMatrix™ Basement Membrane Gel on ice in refrigerator or cold room (2°C to 8°C).
2. *One Hour Prior to Thawing the iPS Cells* – Prepare coated plates as described.
3. *30 Minutes Prior to Handling Cells* – Pre-warm Complete Pluripotent Stem Cell SFM XF/FF (stem cell culture medium) at 37°C for at least 30 minutes before adding to cells. If using ROCK Inhibitor Y27632, prepare stem cell culture medium supplemented with final concentration of 10 µM ROCK Inhibitor Y27632. Stem cell culture medium with ROCK inhibitor must be used immediately.

Note: Addition of ROCK inhibitor has been shown to increase the survival rate during subcultivation and thawing of human iPSCs. The use of ROCK inhibitor may cause a transient spindle-like morphology effect on the cells. However, the colony morphology will recover after subsequent media change without ROCK inhibitor.

Protocol for Coating Plates

Important: CellMatrix™ Gel will solidify in 15 to 30 minutes above 15° C. Keep CellMatrix™ Gel and labware on ice at all times to prevent the matrix from gelling prematurely.
Calculate the appropriate CellMatrixä volume per plate based on concentration and usage. The concentration of CellMatrixä is found on the product label.

Example: 2 mL of Cell Matrix at 150 µg/mL is required to coat one 6 cm dish. To coat two 6 cm dishes, prepare as follows:

Dilute CellMatrix in DMEM:F12 at a working concentration of 150 µg/mL:

Protein concentration of CellMatrix (on product label): 14 mg/mL.

(4 mL) x (0.15 mg/mL) = 0.043 mL
14 mg/mL
Add 43 µL CellMatrix directly in 4ml DMEM: F12.

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1. Thaw CellMatrix Gel in the refrigerator (2°C to 8°C), on ice, overnight.

Initiation of Cultures

1. Rapidly thaw the cells by placing the cryovial in a 37°C water bath, swirling gently. Remove the cryovial from the water bath when only a few ice crystals are remaining.
2. Sterilize the cryovial by rinsing with 70% ethanol. All of the operations from this point on should be carried out under strict aseptic conditions.
3. Using a 1 mL or 5 mL pipette, gently transfer the cell suspension to a 15 mL conical tube.
4. Slowly add 4 mL stem cell culture medium drop-wise, to the conical tube. Rinse the cryovial by adding and removing an additional 1 mL of medium and transfer the liquid to the 15 mL conical tube. Shake the conical tube gently to mix the cells while adding media. Do not break apart the aggregates into a single-cell suspension, as it is crucial to maintain the cells in aggregates.
5. Centrifuge the cells at 200 x g for 5 minutes.
6. Aspirate the supernatant and discard. Gently tap on the bottom of the tube to loosen the cell pellet.
7. Add 1 mL of stem cell culture medium with ROCK Inhibitor Y27632. Gently resuspend the pellet by pipetting up and down 2 to 3 times with a 1 mL tip. Do not over pipette, as it is crucial to maintain the cells in aggregates.
8. Aspirate the coating solution from the plates prepared in step 4 of the Protocol for Coating Plates section. Add 4 mL of stem cell culture medium with ROCK Inhibitor Y27632 to each of two 6 cm dishes.
9. Seed 0.5 mL of cell aggregates onto the dishes prepared in step 8.
10. Incubate the culture at 37°C in a suitable incubator. A 5% CO_2 in air atmosphere is recommended if using the medium described on this product sheet.

Subculturing Procedure

Post thaw day 1, perform a 100% medium change and remove all cells that did not attach. Perform a 100% medium change every day. Passage the cells every 4 to 5 days (80% confluent) at an appropriate split ratio (a 1:4 split ratio is recommended). If the colonies are close to, or touching each other, the culture is overgrown. Overgrowth will result in differentiation.

ROCK Inhibitor Y27632 is not necessary each time the culture medium is changed. It is recommended when the cells are recovering from thaw or being passaged.

This protocol is designed to passage stem cell colonies cultured in a 6 cm dish, using Stem Cell Dissociation Reagent to detach the cell colonies. Stem Cell Dissociation Reagent is stored as a 0.5 U/mL working solution at -20°C. The recommended spilt ratio is 1:4. Volumes should be adjusted according to the size and number of the tissue culture vessels to be processed. Dissolve the appropriate amount of Stem Cell Dissociation Reagent in DMEM: F-12 medium to prepare a 0.5 U/mL working solution.

Example: To prepare 40 mL of a 0.5 U/mL working solution:

Specific activity of Stem Cell Dissociation Reagent (on product label): 1.46 U/mg

$$\frac{(40\text{ mL})(0.5\text{ U/mL})}{(1.46\text{ U/mg})} = 13.7\text{ mg.}$$

Dissolve 13.7 mg Stem Cell Dissociation Reagent in 40 mL DMEM: F-12.

Note: Addition of ROCK inhibitor has been shown to increase the survival rate during subcultivation and thawing of human iPSCs. The use of ROCK inhibitor may cause a transient spindle-like morphology effect on the cells. However, the colony morphology will recover after subsequent media change without ROCK inhibitor.

1. Warm an aliquot of Stem Cell Dissociation Reagent working solution to room temperature.
2. Aspirate and discard the stem cell culture medium.
3. Rinse the cells twice by adding and discarding 4 mL of D-PBS.
4. Add 2 mL of Stem Cell Dissociation Reagent working solution to the dish.
5. Incubate at 37°C for 10 to 15 minutes or until the edges of the individual colonies begin to loosen and fold back. View the dish under the microscope starting at 5 minutes as incubation time will vary depending on the cell line and colony size.
6. Aspirate the Stem Cell Dissociation Reagent and gently rinse the colonies with 4 mL of DMEM: F-12 Medium, taking care not to dislodge the cells during manipulation. Aspirate the DMEM: F12 rinse and discard.
7. Add 2 mL of stem cell culture medium with ROCK Inhibitor Y27632 to the dish, and detach the cells by pipetting up and down **2 to 3 times** with a 1 mL tip. **Take care not to over-pipette the culture into a single-cell suspension as single cells will not establish colonies after seeding. If cells are not detaching, use a cell scraper to detach the cells.**
8. Transfer the cell aggregates to a 15 mL conical tube.
9. Add an additional 3 mL of stem cell culture medium with ROCK Inhibitor Y27632 to the dish to collect any remaining cells. Transfer this rinse to the 15 mL conical tube containing the cell aggregates.
10. Centrifuge the cell aggregates at 200 x *g* for 5 minutes.

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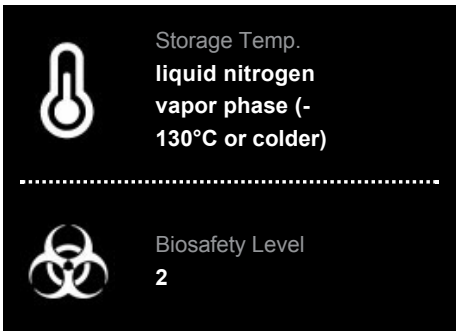

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11. Aspirate the supernatant and discard.
12. Add 1 mL of stem cell culture medium with ROCK inhibitor Y27632. Gently resuspend the pellet by pipetting up and down **2 to 3** times with a 1 mL tip, maintaining the small cell aggregates. **Take care not to over-pipette the culture into a single-cell suspension as single cells will not establish colonies after seeding.**
13. Plate the cells as desired on feeder or feeder-free cultures.
14. Incubate the culture at 37°C in a humidified 5% CO_2/95% air incubator. Perform a 100% medium change every day. Passage the cells every 4 to 5 days (80% confluent).

Cryopreservation

For optimal results, cryopreserve stem cell colonies when the cell cultures are 80% confluent. This protocol is designed to cryopreserve stem cell colonies cultured in a 6 cm dish.

1. Detach stem cell colonies from the dish as described in the recommended subculturing protocol (steps 1-11). Gently tap the bottom of the tube to loosen the cell pellet.
2. Take the Stem Cell Freezing Media from storage and swirl to mix. Keep cold. Decontaminate by dipping in or spraying with 70% alcohol.
3. Add 2 mL of cold Stem Cell Freezing Media to the tube. Gently resuspend the pellet by pipetting up and down 5-6 times with a 1 mL tip, maintaining the cell aggregates.
4. Immediately transfer 1 mL each of the cell suspension into two labeled cryovials.
5. Freeze the cells gradually at a rate of -1°C/min until the temperature reaches -70°C to -80°C. An isopropanol freezing container also may be used.
6. The cells should not be left at -80°C for more than 24 to 48 hours. Once at -80°C, frozen cryovials should be transferred to the vapor phase of liquid nitrogen for long-term storage.

References

References and other information relating to this product are available online at www.atcc.org.

Quality Control Information

Cells are tested for post-freeze viability and growth, sterility (including mycoplasma), identity by STR analysis and karyotype by G-banding. Each lot is tested for pluripotency using flow cytometry for the expression of the pluripotent markers. Differentiation potential is tested by embryoid body (EB) formation and subsequent analysis for the three germ layers by qRT-PCR. A Certificate of Analysis is available upon request.

Use Restrictions

These cells are distributed for research purposes only. ATCC recommends that individuals contemplating commercial use of any cell line first contact the originating investigator to negotiate an agreement. Third party distribution of this cell line is discouraged, since this practice has resulted in the unintentional spreading of cell lines contaminated with inappropriate animal cells or microbes.

Biosafety Level: 2

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the current publication of the *Biosafety in Microbiological and Biomedical Laboratories* from the U.S. Department of Health and Human Services Centers for Disease Control and Prevention and National Institutes for Health.

ATCC Warranty

The viability of ATCC® products is warranted for 30 days from the date of shipment, and is valid only if the product is stored and cultured according to the information included on this product information sheet. ATCC lists the media formulation that has been found to be effective for this strain. While other, unspecified media may also produce satisfactory results, a change in media or the absence of an additive from the ATCC recommended media may affect recovery, growth and/or function of this strain. If an alternative medium formulation is used, the ATCC warranty for viability is no longer valid.

Disclaimers

This product is intended for laboratory research purposes only. It is not intended for use in humans.

While ATCC uses reasonable efforts to include accurate and up-to-date information on this product sheet, ATCC makes no warranties or representations as to its accuracy. Citations from scientific literature and patents are provided for informational purposes only. ATCC does not warrant that such information has been confirmed to be accurate.

This product is sent with the condition that you are responsible for its safe storage, handling, and use. ATCC is not liable for any damages or injuries arising from receipt and/or use of this product. While

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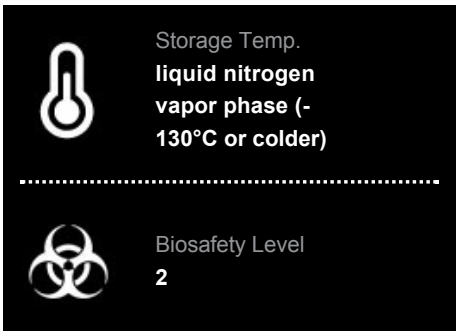

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reasonable effort is made to insure authenticity and reliability of strains on deposit, ATCC is not liable for damages arising from the misidentification or misrepresentation of cultures.

Please see the enclosed Material Transfer Agreement (MTA) for further details regarding the use of this product. The MTA is also available on our Web site at www.atcc.org

Additional information on this culture is available on the ATCC web site at www.atcc.org.
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