ATCC

Product Sheet

# Primary Corneal Epithelial Cells; Normal, Human (ATCC® PCS-700-010™)

**Please read this FIRST**

Storage Temp.
**-130°C or below**

Biosafety Level
**1**

## Intended Use

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

## Citation of Strain

If use of this culture results in a scientific publication, it should be cited in that manuscript in the following manner: Primary Corneal Epithelial Cells; Normal, Human (ATCC® PCS-700-010™)

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

800.638.6597 or 703.365.2700
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*Or contact your local distributor*

## Description

ATCC® Normal Human Primary Corneal Epithelial Cells, when grown in Corneal Epithelial Cell Basal Media supplemented with Corneal Epithelial Cell Growth Kit components, provide an ideal cell system to propagate corneal epithelial cells in serum-free conditions. The cells are cryopreserved at the second passage to ensure the highest viability and plating efficiency. ATCC® Primary Cell Solutions™ cells, media, supplements and reagents are quality tested together to guarantee optimum performance and reliability.

**Components:** One vial of Primary Corneal Epithelial Cells; Normal, Human (ATCC® PCS-700-010™) containing a minimum of 5 x $10^5$ viable cells (provided).

**Also Required:**

A. One bottle of Corneal Epithelial Cell Basal Medium (ATCC PCS-700-030) plus one Corneal Epithelial Cell Growth Kit (ATCC PCS-700-040) that contains the following growth supplements: apo-transferrin, epinephrine, Extract P, hydrocortisone hemisuccinate, L-Glutamine, recombinant human (rh) insulin and CE Growth Factor.
B. Optional media supplements:
    1. Gentamicin-Amphotericin B Solution (ATCC PCS-999-025)
    2. Penicillin-Streptomycin-Amphotericin B Solution (ATCC PCS-999-002)
    3. Phenol Red (ATCC PCS-999-001)
C. Reagents for subculture
    1. D-PBS (ATCC 30-2200)
    2. Trypsin-EDTA for Primary Cells (ATCC PCS-999-003) containing 0.05% Trypsin and 0.02% EDTA. Note: Do not use other trypsin-EDTA concentrations with ATCC PCS-700-010.
    3. Trypsin Neutralizing Solution (ATCC PCS-999-004)

## Cell Characteristics

**Tissue:** Cornea

**Morphology:** Epithelial, packed cuboidal

**Growth Properties:** Adherent

## 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.

## Preparation of Complete Growth Medium

1. Obtain one Corneal Epithelial Cell Growth Kit from the freezer; make sure that the caps of all components are tight.
2. Thaw the components of the growth kit just prior to adding them to the basal medium. Warm the L-glutamine component in a 37°C water bath and shake to dissolve any precipitates prior to adding to the basal medium.
3. Obtain one bottle of Corneal Epithelial Cell Basal Medium (485 mL) from cold storage.
4. Decontaminate the external surfaces of all growth kit component vials and the basal medium bottle by spraying them with 70% ethanol.
5. Using aseptic technique and working in a laminar flow hood or biosafety cabinet, transfer the

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indicated volume of each growth kit component, as indicated in Table 1, to the bottle of basal medium using a separate sterile pipette for each transfer.

**Table 1.** Corneal Epithelial Cell Growth Kit Components

| Component | Volume | Final Concentration |
|---|---|---|
| Apo-transferrin | 0.5 mL | 5 mg/mL |
| Epinephrine | 0.5 mL | 1.0 mM |
| Extract P | 2 mL | 0.4% |
| Hydrocortisone Hemisuccinate | 0.5 mL | 100 ng/mL |
| L-Glutamine | 15 mL | 6 mM |
| rh Insulin | 0.5 mL | 5 mg/mL |
| CE Growth Factor | 1 mL | Proprietary formulation |

Antimicrobials and phenol red are not required for proliferation but may be added if desired. The recommended volume of each ***optional*** component to be added to the complete growth media is summarized in Table 2.

**Table 2.** Addition of Antimicrobials/Antimycotics and Phenol Red (Optional)

| Component | Volume | Final Concentration |
|---|---|---|
| Gentamicin-Amphotericin B Solution | 0.5 mL | Gentamicin: 10 µg/mL<br>Amphotericin B: 0.25 µg/mL |
| Penicillin-Streptomycin-Amphotericin B Solution | 0.5 mL | Penicillin: 10 Units/mL<br>Streptomycin: 10 µg/mL<br>Amphotericin B: 25 ng/mL |
| Phenol Red | 0.5 mL | 33 µM |

6. Tightly cap the bottle of complete growth medium and swirl the contents gently to assure a homogeneous solution. Do not shake forcefully to avoid foaming. Label and date the bottle.
7. Complete growth media should be stored in the dark at 2°C to 8°C (do not freeze). When stored under these conditions, complete growth media is stable for 30 days.

## Handling Procedure for Frozen Cells and Initiation of Culture

1. ***Refer to the batch specific information for the total number of viable cells recovered from this lot of ATCC PCS-700-010.***
2. Using the total number of viable cells, determine how much surface area can be inoculated to achieve an initial seeding density of 5,000 cells per $cm^2$.
3. Prepare the desired combination of flasks. Add 5 mL of complete growth medium per 25 $cm^2$ of surface area. Place the flasks in a 37°C, 5% $CO_2$, humidified incubator and allow the media to pre-equilibrate to temperature and pH for 30 minutes prior to adding cells.
4. While the culture flasks equilibrate, remove one vial of ATCC PCS-700-010 from storage and thaw the cells by gentle agitation in a 37°C water bath. To reduce the possibility of contamination, keep the O-ring and cap out of the water. Thawing should be rapid (approximately 1 to 2 minutes).
5. Remove the vial from the water bath as soon as the contents are thawed, and decontaminate by dipping in or spraying with 70% ethanol. *All operations from this point onward should be carried out under strict aseptic conditions.*
6. Add the appropriate volume of complete growth medium [volume = (1 mL x number of flasks to be seeded) - 1 mL] into a sterile conical tube. Using a sterile pipette, transfer the cells from the cryovial to the conical tube. Gently pipette the cells to homogenize the suspension. Do not centrifuge.
7. Transfer 1.0 mL of the cell suspension to each of the pre-equilibrated culture flasks prepared in steps 1 to 3 of *Handling Procedure for Frozen Cells and Initiation of Culture*. Pipette several times, then cap and gently rock each flask to evenly distribute the cells.
8. Place the seeded culture flasks in the incubator at 37°C, 5% $CO_2$ atmosphere. Incubate for at least 24 hours before processing the cells further.

## Maintenance

1. Before beginning, pre-warm complete growth media in a 37°C water bath. This will take between 10 and 30 minutes, depending on the volume. If using a small volume of medium (50 mL or less), warm only the volume needed in a sterile conical tube. **Avoid warming complete growth media multiple times.**

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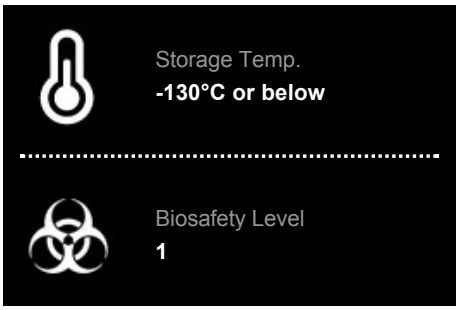


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2. 24 hours after seeding, remove the cells from the incubator and view each flask under the microscope to determine percent cellular confluence.
3. Carefully remove the spent media without disturbing the monolayer.
4. Add 5 mL of fresh, pre-warmed complete growth medium per 25 $cm^2$ of surface area and return the flasks to the incubator.
5. After 24 to 48 hours, view each flask under the microscope to determine percent cellular confluence. If not ready to passage, repeat steps 3 and 4 as described above. When cultures have reached approximately 80% to 90% confluence, and are actively proliferating (many mitotic figures are visible), it is time to subculture.

   **Note:** During normal growth, we have noticed that corneal epithelial cells tend to detach and reattach; the cells are still viable and healthy. Corneal epithelial cells are contact inhibited. It is essential that the cells be subcultured BEFORE reaching confluence as post-confluent cells exhibit slower proliferation and changes in morphology after passaging.

## Subculturing

1. Passage normal corneal cells when the culture has reached approximately 80% to 90% confluence.
2. Warm both the Trypsin-EDTA for Primary Cells (ATCC PCS-999-003) and the Trypsin Neutralizing Solution (ATCC PCS-999-004) to room temperature prior to dissociation. Warm the complete growth medium to 37°C prior to use with the cells.
3. For each flask, carefully aspirate the spent media without disturbing the monolayer.
4. Rinse the cell layer one time with 3 to 5 mL D-PBS (ATCC 30-2200) to remove residual medium.
5. Add pre-warmed trypsin-EDTA solution (1 to 2 mL for every 25 $cm^2$) to each flask.
6. Gently rock each flask to ensure complete coverage of the trypsin-EDTA solution over the cells, and then aspirate the excess fluid off of the monolayer.
7. Observe the cells under the microscope. When the cells pull away from each other and round up (typically within 1 to 3 minutes), remove the flask from the microscope and gently tap it from several sides to promote detachment of the cells from the flask surface.
8. When the majority of cells appear to have detached, quickly add an equal volume of the Trypsin Neutralizing Solution (ATCC PCS-999-004) to each flask. Gently pipette or swirl the culture to ensure all of the trypsin-EDTA solution has been neutralized.
9. Transfer the dissociated cells to a sterile centrifuge tube and set aside while processing any remaining cells in the culture flask.
10. Add 3 to 5 mL D-PBS (ATCC 30-2200) to the tissue culture flask to collect any additional cells that might have been left behind.
11. Transfer the cell/D-PBS suspension to the centrifuge tube containing the trypsin-EDTA-dissociated cells.
12. Repeat steps 10 and 11 as needed until all cells have been collected from the flask.
13. Centrifuge the cells at 150 x g for 3 to 5 minutes.
14. Aspirate neutralized dissociation solution from the cell pellet and resuspend the cells in 2 to 8 mL fresh, pre-warmed, complete growth medium.
15. Count the cells and seed new culture flasks at a density of 5,000 viable cells per $cm^2$.
16. Place newly seeded flasks in a 37°C, 5% $CO_2$ incubator for at least 24 to 48 hours before processing the cells further. Refer to *Maintenance* for guidelines on feeding.

## Quality Control Specifications

**Growth**
Each lot of ATCC® PCS-700-010 is tested to ensure the cells will grow for ≥ 15 population doublings after thaw in complete growth media (Dermal Cell Basal Medium plus one Keratinocyte Growth Kit).
**Viability:** ≥ 50% when thawed from cryopreservation.

**Sterility Testing**
**Bacteria and Yeast:** Negative
**Mycoplasma:** Negative

**Viral Testing**
**Hepatitis B:** Negative
**Hepatitis C:** Negative
**HIV-1:** Negative
**HIV-2:** Negative

## Biosafety Level: 1

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Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the current publication of the Biosafety in *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.

## Human Material Precaution

All tissues used for isolation are obtained under informed consent and conform to HIPAA standards to protect the privacy of the donor's personal health information. It is best to use caution when handling any human cells. We recommend that all human cells be accorded the same level of biosafety consideration as cells known to carry HIV. With infectious virus assays or viral antigen assays, even a negative test result may leave open the possible existence of a latent viral genome.

## 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 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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