ATCC® Normal Human Primary Coronary Artery Endothelial Cells, when grown in Vascular Cell Basal Media supplemented with Endothelial Cell Growth Kit components, provide an ideal cell system to propagate coronary artery endothelial cells in low serum conditions with or without the addition of human recombinant VEGF. The cells are cryopreserved in the third 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 Primary Coronary Artery Endothelial Cells; Normal, Human (ATCC® PCS-100-020™) containing a minimum of $5 \times 10^5$ viable cells (provided).

Also Required:
A. One bottle of Vascular Cell Basal Medium (ATCC® PCS-100-030) plus one Endothelial Cell Growth Kit of either:
   1. Endothelial Cell Growth Kit-BBE (ATCC® PCS-100-040) containing each of the following growth supplements: Bovine Brain Extract, rh EGF, L-glutamine, heparin sulfate, hydrocortisone hemisuccinate, Fetal Bovine Serum, and ascorbic acid.
   2. Endothelial Cell Growth Kit-VEGF (ATCC® PCS-100-041) containing each of the following growth supplements: rh VEGF, rh EGF, rh FGF basic, rh IGF-1, ascorbic acid, L-glutamine, heparin sulfate, hydrocortisone hemisuccinate and Fetal Bovine Serum.
B. Optional media supplements
   1. Gentamicin-Ampicillin 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-100-020.
   3. Trypsin Neutralizing Solution (ATCC PCS-999-004)

Cell Characteristics

Morphology: Cobblestone appearance with large dark nuclei; during proliferation, cells are small and evenly sized, display a high mitotic index and show no presence of smooth muscle cells.

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 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. It is necessary
Primary Coronary Artery Endothelial Cells; Normal, Human (HCAEC) (ATCC® PCS-100-020™)

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 Coronary Artery Endothelial Cells; Normal, Human (HCAEC) (ATCC® PCS-100-020™)

Table 1. If using the Endothelial Cell Growth Kit-BBE (ATCC® PCS-100-040), add the indicated volume for each component:

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
<th>Final Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine Brain Extract (BBE)</td>
<td>1.0 mL</td>
<td>0.2%</td>
</tr>
<tr>
<td>rh EGF</td>
<td>0.5 mL</td>
<td>5 ng/mL</td>
</tr>
<tr>
<td>L-glutamine</td>
<td>25.0 mL</td>
<td>10 mM</td>
</tr>
<tr>
<td>Heparin sulfate</td>
<td>0.5 mL</td>
<td>0.75 Units/mL</td>
</tr>
<tr>
<td>Hydrocortisone hemisuccinate</td>
<td>0.5 mL</td>
<td>1 µg/mL</td>
</tr>
<tr>
<td>Fetal Bovine Serum</td>
<td>10.0 mL</td>
<td>2%</td>
</tr>
<tr>
<td>Ascorbic acid</td>
<td>0.5 mL</td>
<td>50 µg/mL</td>
</tr>
</tbody>
</table>

Table 2. If using the Endothelial Cell Growth Kit-VEGF (ATCC® PCS-100-041), add the indicated volume for each component:

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
<th>Final Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>rh VEGF</td>
<td>0.5 mL</td>
<td>5 ng/mL</td>
</tr>
<tr>
<td>rh EGF</td>
<td>0.5 mL</td>
<td>5 ng/mL</td>
</tr>
<tr>
<td>rh FGF basic</td>
<td>0.5 mL</td>
<td>5 ng/mL</td>
</tr>
<tr>
<td>rh IGF-1</td>
<td>0.5 mL</td>
<td>15 ng/mL</td>
</tr>
<tr>
<td>L-glutamine</td>
<td>25.0 mL</td>
<td>10 mM</td>
</tr>
<tr>
<td>Heparin sulfate</td>
<td>0.5 mL</td>
<td>0.75 Units/mL</td>
</tr>
<tr>
<td>Hydrocortisone hemisuccinate</td>
<td>0.5 mL</td>
<td>1 µg/mL</td>
</tr>
<tr>
<td>Fetal Bovine Serum</td>
<td>10.0 mL</td>
<td>2%</td>
</tr>
<tr>
<td>Ascorbic acid</td>
<td>0.5 mL</td>
<td>50 µg/mL</td>
</tr>
</tbody>
</table>

Antimicrobials and phenol red are not required for proliferation but may be added if desired. The recommended volume of either of the optional components (GA solution or PSA solution) to be added to the complete growth media is summarized in Table 3.

Table 3. Addition of Antimicrobials/Antimycotics and Phenol Red (Optional)

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
<th>Final Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin-Amphotericin B Solution</td>
<td>0.5 mL</td>
<td>Gentamicin: 10 µg/mL Amphotericin B: 0.25 µg/mL</td>
</tr>
<tr>
<td>Penicillin-Streptomycin-Amphotericin B Solution</td>
<td>0.5 mL</td>
<td>Penicillin: 10 Units/mL Streptomycin: 10 µg/mL Amphotericin B: 25 µg/mL</td>
</tr>
<tr>
<td>Phenol Red</td>
<td>0.5 mL</td>
<td>33 µM</td>
</tr>
</tbody>
</table>

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-100-020.

2. Using the total number of viable cells, determine how much surface area can be inoculated to achieve an initial seeding density between 2,500 and 5,000 cells per cm².

3. Prepare the desired combination of flasks. Add 5 mL of complete growth media per 25 cm² of surface area. Place the flasks in a 37°C, 5% CO₂ humidified incubator and allow the media to pre-equilibrate to warm the L-glutamine component in a 37°C water bath and shake to dissolve any precipitates prior to adding to the basal medium.

4. Obtain one bottle of Vascular Cell Basal Medium (475 mL) from cold storage.

5. Decontaminate the external surfaces of all growth kit component vials and the basal medium bottle by spraying them with 70% ethanol.

6. Using aseptic technique, and working in a laminar flow hood or biosafety cabinet, transfer the volume of each growth kit component, as indicated in either Table 1 or 2, to the bottle of basal medium using a separate sterile pipette for each transfer.
Subculturing

1. Passage normal coronary artery endothelial cells when culture has reached approximately 80% 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 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 two times with 3 to 5 mL D-PBS (ATCC 30-2200) to remove residual traces of serum.
5. Add pre-warmed trypsin-EDTA solution (1 to 2 mL for every 25 cm²) 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 3 to 5 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 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 flask.
10. Add 3 to 5 mL D-PBS (ATCC 30-2200) to the 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 the neutralized dissociation solution from the cell pellet and resuspend the cells in 2 to 8 mL fresh, pre-warmed, complete growth medium. Count the cells and seed new flasks at a density between 2,500 and 5,000 cells per cm².
15. Place newly seeded flasks in a 37°C, 5% CO₂ incubator for at least 24 to 48 hours before processing the cells further. Refer to Maintenance for guidelines on feeding.
Growth
Each lot of ATCC® PCS-100-020 is tested to ensure the cells will grow for ≥ 15 population doublings after thaw in complete growth media (Vascular Cell Basal Medium plus one Endothelial Cell Growth Kit).

Viability:
≥ 70% 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

Specific Staining
Von Willebrand factor positive and smooth muscle alpha-actin negative.

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.

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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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