Components: One vial of Bone Marrow-Derived Mesenchymal Stem Cells; Normal, Human (ATCC® PCS-500-012™) containing a minimum of 1 x 10^6 viable cells (provided).

Also Required:
A. One bottle of Mesenchymal Stem Cell Basal Medium for Adipose, Umbilical and Bone Marrow-derived MSCs (ATCC PCS-500-030) plus one Mesenchymal Stem Cell Growth Kit for Bone Marrow-derived MSCs (ATCC PCS-500-041) that contains the following growth supplements: FBS, rh FGF basic, rh IGF-I, and L-Alanyl-L-Glutamine.

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. DPBS (ATCC 30-2200)
2. Trypsin-EDTA for Primary Cells (ATCC PCS-999-003) containing 0.05% Trypsin and 0.02% EDTA.
3. Trypsin Neutralizing Solution (ATCC PCS-999-004)

D. Differentiation media for BM-MSCs
1. Adipocyte Differentiation Toolkit (ATCC PCS-500-053)
2. Osteocyte Differentiation Toolkit (ATCC PCS-500-052)
3. Chondrocyte Differentiation Toolkit (ATCC PCS-500-051)

Cell Characteristics
Tissue: Bone
Morphology: spindle shaped, fibroblast-like
Growth Properties: adherent

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 Mesenchymal Stem Cell Growth for Bone Marrow-derived MSCs (ATCC PCS-500-041) 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 (ATCC PCS-500-030).
3. Obtain one bottle of Mesenchymal Stem 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 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: Bone Marrow-Mesenchymal Stem Cell Growth Kit Components
Table 2. 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</td>
<td>0.5 mL</td>
<td>Gentamicin: 10 µg/mL, Amphotericin B: 25 ng/mL</td>
</tr>
<tr>
<td>Penicillin-Streptomycin-</td>
<td>0.5 mL</td>
<td>Penicillin: 10 Units/mL, Streptomycin: 10 µg/mL, Amphotericin B: 25 ng/mL</td>
</tr>
<tr>
<td>Amphotericin B Solution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenol Red</td>
<td>0.5 mL</td>
<td>33 µM</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 2.
- Before beginning, prewarm 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.
- 24 hours after seeding, remove the cells from the incubator and view each flask under the microscope to determine percent cellular confluence.
- Carefully remove the spent media without disturbing the monolayer.
- Add 5 mL of fresh, prewarmed complete growth medium per 25 cm² of surface area and return the flasks to the incubator.
- 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% confluence, and are actively proliferating (many mitotic figures are visible), it is time to subculture. Note: BM-MSCs are contact inhibited. It is essential that the cells be subcultured BEFORE reaching 100%
Bone Marrow-Derived Mesenchymal Stem Cells; Normal, Human (ATCC® PCS-500-012™)

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: Bone Marrow-Derived Mesenchymal Stem Cells; Normal, Human (ATCC® PCS-500-012™)

Subculturing

1. Passage normal BM-MSCs when the 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 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 prewarmed 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.
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 270 x g for 5 minutes.
14. Aspirate neutralized dissociation solution from the cell pellet and resuspend the cells in 2 to 8 mL fresh, prewarmed, complete growth medium.
15. Count the cells and seed new culture flasks at a density of 5,000 viable cells per cm².
16. 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.

Viability: ≥ 70% when thawed from cryopreservation

Quality Control Specifications

Growth

Each lot of ATCC® PCS-500-012™ is tested to ensure the cells can be passaged at least three times (i.e. approximately 9 to 10 population doublings) after thaw in complete growth media (Mesenchymal Stem Cell Basal Medium plus one Mesenchymal Stem Cell Growth Kit-for Bone marrow-derived MSCs) and support differentiation into adipocyte, osteoblasts, and chondrocytes. Viability: ≥ 70% when thawed from cryopreservation.

Sterility Testing

Bacteria and Yeast: Negative
Mycoplasma: Negative

Viral Testing

Hepatitis B: Negative
Hepatitis C: Negative
HIV: Negative

Specific Staining

Positive expression for CD29, CD44, CD73, CD90, CD105, and CD166.
Negative expression for CD14, CD34, CD19, and CD45.

Biosafety Level: 1

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

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