**Product sheet**

# Human Mesenchymal Stem Cells - Adipose Tissue | 300645

## General information

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| **Description** | Human Mesenchymal Stem Cells (hMSCs) derived from adipose tissue are multipotent stromal cells capable of differentiating into various cell lineages, including adipocytes, osteoblasts, and chondrocytes. These cells are isolated from the stromal vascular fraction of adipose tissue, which is a rich source of mesenchymal stem cells compared to other tissues. Adipose-derived hMSCs are particularly valued in research due to their accessibility, ease of isolation, and higher yield, making them a crucial tool for studies in regenerative medicine, tissue engineering, and cellular therapy.<br><br>hMSCs are self-renewing multipotent cells that can be directed to differentiate into a wide variety of cell types in vitro. The direct differentiation of these cells into adipocytes, osteoblasts, and chondrocytes has been well-documented using specific differentiation media. Early passage hMSCs are cryopreserved using a specialized cryomedium, ensuring that post-thaw viability is maintained at a minimum of 92% to 95%, as confirmed by the Trypan Blue dye exclusion test. Each cryovial contains 1 x $10^6$ cells, collected from healthy donors who provided informed consent for the donation of cell material.<br><br>Adipose tissue-derived hMSCs exhibit robust self-renewal capacities and can be expanded extensively in vitro without losing their differentiation potential. These cells undergo rigorous quality control testing to ensure their identification, purity, potency, viability, and appropriateness for intended in vitro research applications. Given their multipotency, immunomodulatory effects, and paracrine signaling capabilities, adipose tissue-derived hMSCs are widely used in various research applications, including drug screening, disease modeling, and understanding the mechanisms underlying stem cell differentiation. However, it is essential to note that these cells are not intended for therapeutic or in vivo applications.<br><br>What differentiates adipose-derived hMSCs from hMSCs derived from other tissues, such as bone marrow or umbilical cord, is their higher proliferation rate and a greater capacity for adipogenic differentiation. These cells also exhibit a more pronounced immunomodulatory effect, partly due to their unique secretome profile, which includes a higher expression of cytokines and growth factors involved in anti-inflammatory responses. Furthermore, adipose-derived hMSCs are more readily available and require less invasive procedures for isolation compared to bone marrow-derived hMSCs, making them a preferred choice for many researchers. Their distinct characteristics make adipose-derived hMSCs particularly suitable for studies focusing on metabolic disorders, immune regulation, and regenerative medicine. |
| **Organism** | Human |
| **Tissue** | Adipose Tissue |
| **Applications** | Drug testing, regenerative medicine, disease research |

## Characteristics

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| **Age** | Please inquire |
| **Gender** | Please inquire |
| **Ethnicity** | Caucasian |

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| **Morphology** | Well-spread spindle shaped, fibroblast-like morphology for at least within 5 passages. Fewer than 2% cells exhibit spontaneous myofibroblast-like morphology within each passage. |
| **Cell type** | Stem cell |
| **Growth properties** | Adherent |

## Identifiers / Biosafety / Citation

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| **Citation** | Human Mesenchymal Stem Cells, Adipose Tissue (Cytion catalog number 300645) |
| **Biosafety level** | 1 |

## Expression / Mutation

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| **Antigen expression** | A comprehensive panel of markers, including CD73/CD90/CD105 (positive) and CD14/CD34/CD45/HLA-DR (negative), are used in flow cytometry analysis to identify cultivated MSCs (P2-P3) prior to cryopreservation. These markers are recommended by the ISCT MSC committee. |
| **Viruses** | Donor is negative for HBV (PCR), Treponema pallidum (PCR), and HIV-1/2 (IFA). Cells are negative for HBV, HCV, HSV1, HSV2, CMV, EBV, HHV6, Toxoplasma gondii, Treponema pallidum, Chlamydia trachomatis, Ureaplasma urealyticum, and Ureaplasma parvum. |

## Handling

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| **Culture Medium** | Alpha MEM, w: 2.0 mM stable Glutamine, w/o: Ribonucleosides, w/o: Deoxyribonucleosides, w: 1.0 mM Sodium pyruvate, w: 2.2g/L NaHCO3 |
| **Medium supplements** | Supplement the medium with 10% FBS, 2 ng/mL bFGF |
| **Passaging solution** | Trypsin-EDTA |
| **Subculturing** | Remove the old medium from the adherent cells and wash them with PBS that lacks calcium and magnesium. For T25 flasks, use 3-5 ml of PBS, and for T75 flasks, use 5-10 ml. Then, cover the cells completely with Accutase, using 1-2 ml for T25 flasks and 2.5 ml for T75 flasks. Let the cells incubate at room temperature for 8-10 minutes to detach them. After incubation, gently mix the cells with 10 ml of medium to resuspend them, then centrifuge at 300xg for 3 minutes. Discard the supernatant, resuspend the cells in fresh medium, and transfer them into new flasks that already contain fresh medium. |

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| **Seeding density** | 1 to 3 x 10^4 cells/cm^2 |
| **Fluid renewal** | First fluid renewal after 24 hours, then every 2 to 3 days. |
| **Freeze medium** | CM-1 (Cytion catalog number 800100) |

**Handling of cryopreserved cultures**

1. Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit.
2. Upon receipt, either store the cryovial immediately at temperatures below -150°C to ensure the preservation of cellular integrity, or proceed to step 3 if immediate culturing is required.
3. For immediate culturing, swiftly thaw the vial by immersing it in a 37°C water bath with clean water and an antimicrobial agent, agitating gently for 40-60 seconds until a small ice clump remains.
4. Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening.
5. Carefully open the disinfected vial and transfer the cell suspension into a 15 ml centrifuge tube containing 8 ml of room-temperature culture medium, mixing gently.
6. Centrifuge the mixture at 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium.
7. Gently resuspend the cell pellet in 10 ml of fresh culture medium. For adherent cells, divide the suspension between two T25 culture flasks; for suspension cultures, transfer all the medium into one T25 flask to promote effective cell interaction and growth.
8. Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes.

## Quality control / Genetic profile / HLA

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| **Sterility** | Mycoplasma contamination is excluded using both PCR-based assays and luminescence-based mycoplasma detection methods.<br><br>To ensure there is no bacterial, fungal, or yeast contamination, cell cultures are subjected to daily visual inspections. |