NEUROMICS

Human Adipose-Derived Stem Cells (ADSCs) – Type 2 Diabetes Donor

Catalog #: ADSC003

Cell #: >1.0x10^6 cells

Storage: Liquid Nitrogen until ready for culture.
While Culturing keep in 37°C CO_2 incubator

Product Format: Frozen Vial

GENERAL INFORMATION

Human Adipose-Derived Stem Cells (ADSCs) from Type 2 Diabetes (T2D) donors are isolated from subcutaneous adipose tissue of donors with a clinically confirmed diagnosis of T2D. These multipotent mesenchymal stem cells are cryopreserved at passage 1 (P1) to maximize viability and preserve their native, disease-state characteristics.

This unique cell population provides an essential in vitro model for studying the interplay between stem cells and the autoimmune, metabolic, and vascular complications of T2D. Sourced from a disease-specific microenvironment, these ADSCs may exhibit altered paracrine signaling, differentiation potential, and immunomodulatory properties compared to those from healthy donors, offering critical insights for diabetes research and regenerative therapy development.

*Differentiation efficiency may vary due to the inherent biological variability of the obese donor phenotype.

These cells exhibit biological characteristics associated with the obese donor phenotype, which may impact their growth, differentiation, and metabolic behavior compared to cells from lean donors. It is the user's responsibility to determine the suitability of this product for their specific application.

Product is for Research use only.

Frozen Vials are shipped in a Dry Ice Package.

KEY FEATURES & BENEFITS

- **Disease-Specific Model:** Isolated from verified Type 2 Diabetic donors, enabling research within a pathologically relevant cellular context.
- **Research-Ready:** Cryopreserved at P1, ensuring high viability and functionality for studies on diabetic complications, immunomodulation, and autologous cell therapy.
- **Characterized Immunophenotype:** Express standard mesenchymal stem cell surface markers (CD73, CD90, CD105) and lack hematopoietic markers, as defined by the International Society for Cellular Therapy (ISCT).
- **Functionally Validated:** Each lot is tested for viability, sterility, and multipotent differentiation potential (adirogenic, osteogenic).

APPLICATIONS

- **Diabetes Research:** Investigate the impact of the T2D microenvironment on stem cell function, including altered angiogenesis, wound healing, and immunomodulation.
- **Diabetic Complications:** Model cellular mechanisms of diabetic neuropathy, nephropathy, retinopathy, and impaired tissue regeneration.

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- **Immunology & Autoimmunity:** Study the interaction between ADSCs and immune cells (e.g., T-cells) in an autoimmune context.
- **Drug Screening & Discovery:** Test efficacy of novel therapeutics aimed at improving stem cell function or mitigating diabetic complications.
- **Regenerative Medicine:** Explore the potential and limitations of autologous stem cells from diabetic patients for cell-based therapies.

QUALITY CONTROL SPECIFICATIONS

Each lot is tested to meet the following release criteria:

Parameter	Specification	Test Method
Viability (Post-Thaw)	≥ 80%	Trypan Blue Exclusion
Cell Yield per Vial	≥ 1 million Cells	Cell Count
Adherent Growth	Positive for fibroblastic, spindle-shaped morphology	Microscopic Evaluation
Surface Marker Expression	Positive (≥95%): CD73, CD90, CD105 Negative (≤5%): CD14, CD34, CD45, HLA-DR	Flow Cytometry
Trilineage Differentiation	Positive for Oil Red O (Adipogenesis), Alizarin Red S (Osteogenesis), Alcian Blue (Chondrogenesis)	Functional Staining
Microbiological Sterility	No Growth	USP <71>
Mycoplasma	Negative	PCR or Culture Method

TYPICAL DONOR DEMOGRAPHICS & CLINICAL HISTORY

Donors are carefully selected and characterized. A typical profile includes:

- **Diagnosis:** Clinically confirmed Type 2 Diabetes Mellitus.
- **Age Range:** 18 - 65 years
- **Sex:** Male and Female donors available
- **Diabetes Duration:** Variable (provided per lot)
- **Medication:** Insulin therapy
- **Common Comorbidities:** May include autoimmune conditions (e.g., Thyroiditis), and early-stage microvascular complications.

HANDLING OF ARRIVING CELLS

1. Check all containers for leakage or breakage.

2. Remove the frozen cells from the dry ice packaging and immediately place the cells into a -80°C freezer for short-term storage or liquid nitrogen tank for long-term storage.

3. To ensure 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 -70°C. Storage at -70°C will result in loss of viability.

4. When handling cell cultures, the application of stringent aseptic techniques is imperative. Maintaining a contamination-free environment is crucial for preserving the integrity and reliability of experimental results. This involves not only cleanliness but also the use of sterile tools, media, and working environments to prevent contamination from airborne particles, microbial agents, and other sources.

MEDIUM

We recommend Adipose-Derived Stem Cell Growth Medium (cat. ADSCM001) for these cells. The growth medium contains ingredients to support cell growth.

PROTOCOL FOR THAWING THE CELLS

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Note: If you have any questions or need clarification regarding the protocol for culturing these cells, please reach out to Dr. Jensen Auguste at (978) 608-1766 with your questions before beginning.

1. To effectively thaw the cells, submerge the vial containing the frozen cells in a preheated water bath at 37°C. Gently agitate the vial for 1-2 minutes to facilitate uniform thawing. Be careful to keep the cap of the vial above the water level to prevent potential contamination from the water bath, which could compromise sterility.

2. Once the cells are fully thawed, transfer the content of the vial into a sterile 15 mL conical tube that contains 5 mL of fresh Adipose-derived Stem Cell Growth Medium. This medium is specifically formulated to support hADSC growth and ensure optimal recovery following thawing.

3. Following the transfer, centrifuge the cells at a speed of 1,000 rpm (approximately 220 g) for 5 minutes at room temperature. This step helps to pellet the cells, facilitating the removal of any cryoprotectant and cellular debris.

4. After centrifugation, carefully aspirate the supernatant without disturbing the cell pellet. Re-suspend the pellet in fresh Adipose-derived Stem Cell Growth Medium, ensuring thorough mixing to maintain cell viability.

5. Transfer the re-suspended cells into either one 100 mm culture dish or one T75 flask, depending on your experimental requirements. Maintain the culture at 37°C in a humidified atmosphere with 5% CO2. Change the medium every 2-3 days, monitoring the cells until they achieve a density of 70-80% confluence, indicating readiness for subculturing.

STANDARD CULTURE PROCEDURE

1. Once the cells reach a confluence of 70-80%, perform a careful medium change by first aspirating the existing growth medium. Rinse the cells gently with 5 mL of phosphate-buffered saline (PBS) in a T75 flask to remove any residual serum or growth factors that might inhibit trypsinization.
2. Add 3-5 mL of 0.25% Trypsin-EDTA directly to the flask. Incubate the cells at 37°C for approximately 5 minutes. This enzyme mixture will cleave the adhesive proteins that anchor the cells to the culture surface, thereby enabling cell detachment.
3. Once the incubation period is complete, neutralize the trypsin by adding 2-3 volumes of Adipose-derived Stem Cell Growth Medium to ensure the trypsin action is halted and to provide nutrients for cell recovery.
4. Proceed with centrifugation at 1,000 rpm (approximately 220 g) for 5 minutes. After the centrifugation step, carefully re-suspend the cell pellet in the desired volume of growth medium, ensuring an even distribution of cells.
5. Seed the new culture vessels at a density of 5 × 10^3 cells/cm². This seeding density is essential for optimal cell growth and expansion. Continue to change the medium every 2-3 days, monitoring the cells until they reach 70-80% confluence before considering additional passaging.

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