Human Dental Follicle stem cells (DFSC, hDFSC)

300701

GENERAL INFORMATION

Description

Human Dental Follicle Stem Cells (DFSCs, hDFSCs) are a type of mesenchymal stem cell (MSC) derived from the dental follicle, an ectomesenchymal tissue surrounding the developing tooth germ. These cells are of particular interest in regenerative medicine due to their multipotent capabilities, meaning they can differentiate into various cell types, including osteoblasts (bone-forming cells), chondrocytes (cartilage-forming cells), adipocytes (fat cells), and possibly neural cells. DFSCs are typically harvested from the dental follicles of impacted third molars (wisdom teeth) and are valued for their ease of accessibility and minimal ethical concerns compared to other stem cell sources. DFSCs exhibit several key properties that make them promising for therapeutic applications. They possess strong proliferative abilities, maintaining their capacity to self-renew over extended culture periods. Moreover, they have a notable ability to migrate and home to injury sites, a characteristic that enhances their potential for use in tissue engineering and repair. DFSCs also secrete a range of bioactive factors that contribute to their immunomodulatory effects, making them valuable in the treatment of inflammatory conditions.
Research into DFSCs has shown their potential in dental tissue engineering, particularly in the regeneration of periodontal tissues, pulp, and bone. Additionally, their differentiation into neural-like cells opens avenues for neurological applications. Despite the promising attributes of DFSCs, further studies are required to fully understand their differentiation pathways, optimize culture conditions, and confirm their long-term safety and efficacy in clinical settings.

Tissue	Dental

CLASSIFICATION

Organism	Human
Growth properties	Adherent
Biosafety level	1

IDENTIFIERS

Citation

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NCBI TaxID	9606

HANDLING AND CULTURE

Culture medium

DMEM:Ham's F12 (v/v), w: 2.0 mM stable Glutamine, w: 1.2g/L $NaHCO_3$

Incubation atmosphere	37°C, 5% CO_2, humidified atmosphere.

Supplements

Supplement the medium with 5-10% FBS

Dissociation reagent	Accutase

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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.

Seeding density	2 x 10^4 cells/cm^2

Thawing and culturing

Confirm that the vial remains deeply frozen upon delivery, as cells are shipped on dry ice to maintain optimal temperatures during transit.
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.
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.
Perform all subsequent steps under sterile conditions in a flow hood, disinfecting the cryovial with 70% ethanol before opening.
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.
Centrifuge the mixture at 300 x g for 3 minutes to separate the cells and carefully discard the supernatant containing residual freezing medium.
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.
Adhere to established subculture protocols for continued growth and maintenance of the cell line, ensuring reliable experimental outcomes.

QUALITY CONTROL AND CRYOPRESERVATION

Sterility

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

Freeze medium	As a cryopreservation medium, we use 90% FBS + 10% DMSO to maintain viability, or CM-1 (Cytion catalog number 800100), which includes optimized osmoprotectants and metabolic stabilizers to enhance recovery and reduce cryo-induced stress.

Storage conditions

For long-term preservation, place vials in vapor-phase liquid nitrogen at about −150 to −196 °C. Storage at −80 °C is acceptable only as a short interim step before transfer to liquid nitrogen.

Shipping conditions

Cryopreserved cell lines are shipped on dry ice in validated, insulated packaging with sufficient refrigerant to maintain approximately −78 °C throughout transit. On receipt, inspect the container immediately and transfer vials without delay to appropriate storage.

LEGAL AND SAFETY

Safety precautions

When planning to store a cryovial in liquid nitrogen for future thawing, it is mandatory to adhere to stringent safety measures. Appropriate protective gloves and clothing are essential, and the use of a face mask or safety goggles is required during the transfer of frozen samples to or from the liquid nitrogen tank. This is to mitigate the risk of injury from potential cryovial explosions upon removal, which can result in the projection of sharp fragments.

Warranty

At Cytion, we stand behind the quality and viability of our products.
We guarantee that our cells will be viable at the start of culture for
60 days after shipment from our facilities.
We assure that all materials conform to the specifications described in the
Certificate of Analysis and/or Product Sheet.
For full details, please refer to our
Warranty Statement.

Material Transfer Agreement required	Yes

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