PromoCell

Mesenchymal stem cell culture

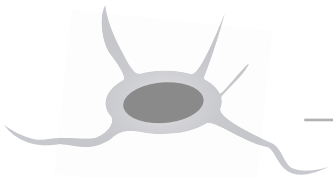
Designed to support every stage of your human mesenchymal stem cell applications

Cell sourcing

Bone marrow

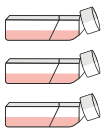
Adipose tissue

Umbilical cord

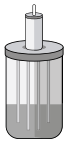


Mesenchymal stem cell

Expansion



2D expansion

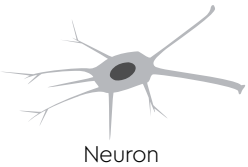


Bioreactor 3D expansion

Excipient GMP-grade manufacturing

Functional analyses

Adipocyte

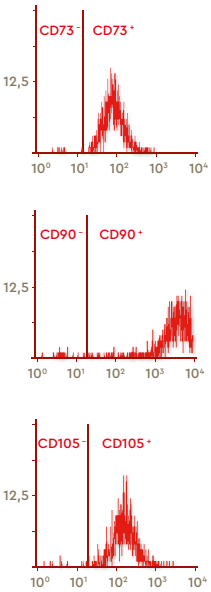


Neuron

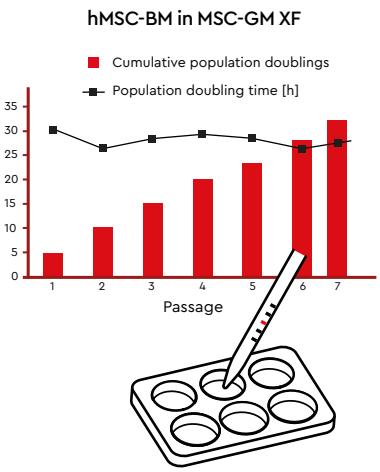
Osteoblast

Chondrocyte

Differentiation

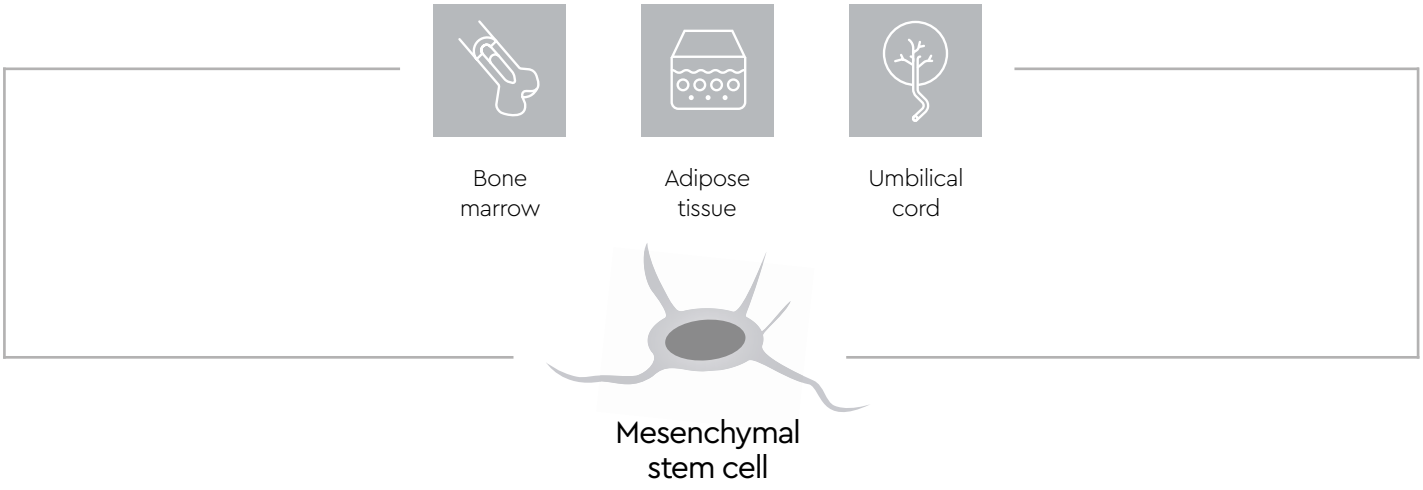


Flow cytometry



Cellular assay

Cell sourcing



The ability of mesenchymal stem cells (MSCs) to differentiate into various specialized cell types makes them crucial for regenerative medicine. However, MSC isolation can be challenging. The use of standardized methods for MSC isolation is crucial for ensuring the reproducibility of research findings.

The availability of MSCs from various tissues, such as adipose-derived MSCs for obesity research and HLA-typed MSCs for drug investigations, is essential for understanding tissue-specific cellular behaviors and developing targeted therapeutic applications. Our hMSCs are harvested from human adipose tissue, bone marrow, and umbilical cord matrix (Wharton's jelly) of individual donors using our Mesenchymal Stem Cell Growth Medium 2. They are tested for their ability to differentiate *in vitro* into adipocytes, chondrocytes, and osteoblasts. Our hMSCs show a **verified marker expression profile** that complies with **ISCT** recommendations, providing well-characterized cells from HLA-typed donors.

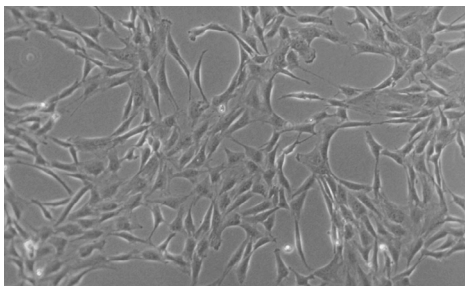


Fig. 1: *Phase-contrast image of human mesenchymal stem cells isolated from bone marrow. Cells were cultured in MSC Growth Medium 2.*

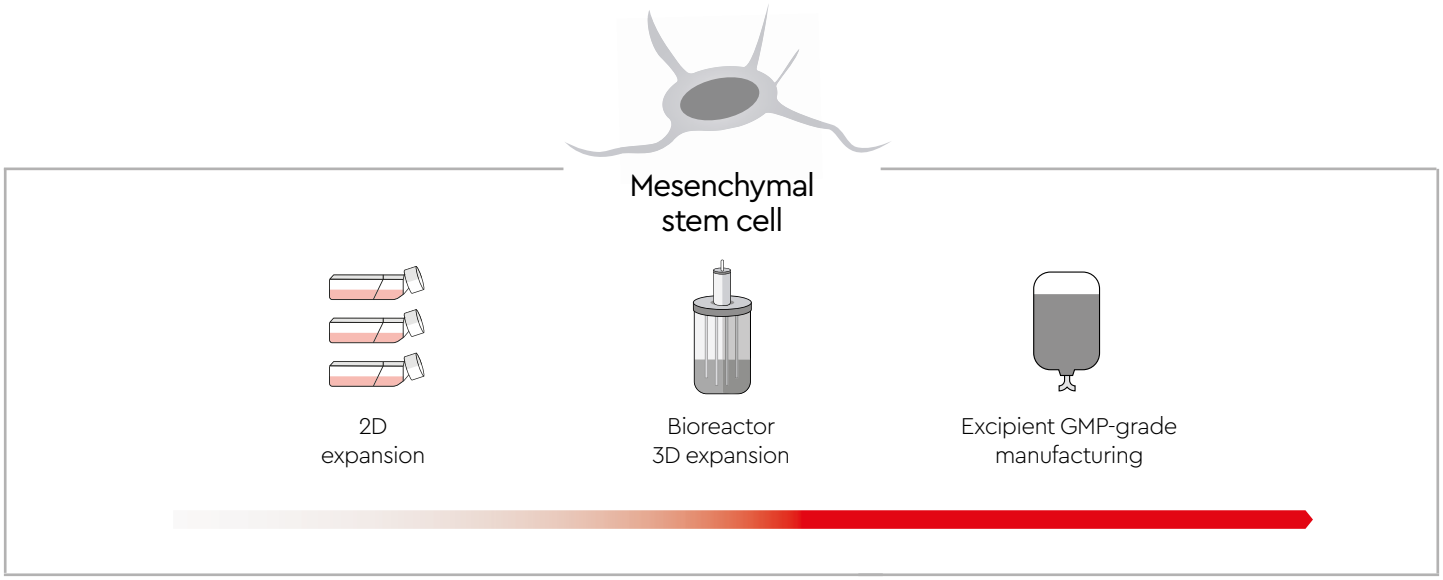
Human Mesenchymal Stem Cells

Product	Marker	Cat. No.
Human Mesenchymal Stem Cells from Bone Marrow (hMSC-BM)	$CD105^+$ /$CD73^+$ $CD90^+$ and CD45- /CD34- CD14- /CD19- HLA-DR-	C-12974
Human Mesenchymal Stem Cells from Umbilical Cord Matrix (hMSC-UC)		C-12971
Human Mesenchymal Stem Cells from Adipose Tissue (hMSC-AT)		C-12977

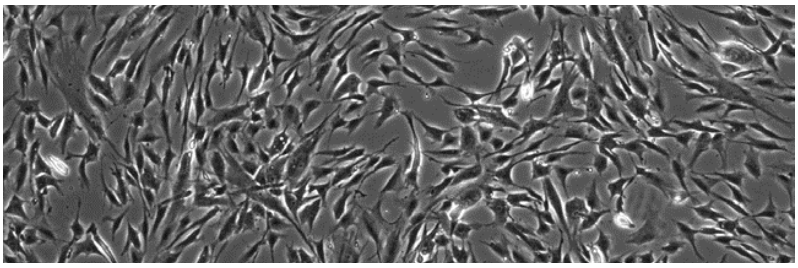
Custom solution:

Struggling to obtain large numbers of MSCs for your research?
We can help you generate large quantities of primary MSCs from individual donors and with a variety of HLA types through our cell expansion service. *Learn more:* *www.promocell.com/services/cell-expansion-service/*

Select the right MSC media for your research needs



Challenges with propagating MSCs include maintaining stemness across passages and maintaining cellular integrity in proliferating stem cells without triggering differentiation. These challenges are critical to overcome as large-scale cell production is essential for the development of MSC-based therapies. Cell culture techniques that address these challenges are crucial for realizing the potential of MSCs for regenerative medicine. Our MSC Growth Media are designed to robustly support the standardized expansion of multipotent hMSCs. Rigorous quality control tests ensure reliable and consistent product quality.



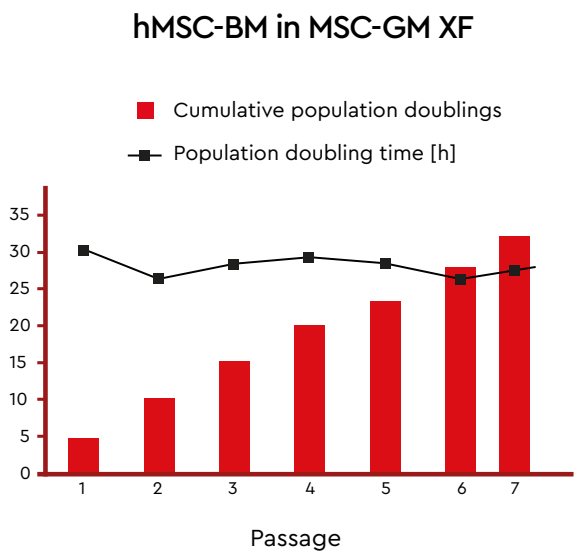


Fig. 2: A) *Human mesenchymal stem cells expanded in MSC Growth Medium XF at passage 7.* ***B)*** *A stable growth rate of less than 30 hours/doubling can be observed even after prolonged in vitro culture for 32 population doublings over the course of 7 passages.*

MSC Isolation and Expansion Media

Product	Size	Cat. No.
Mesenchymal Stem Cell Growth Medium 2 (Ready-to-use)	500 ml	C-28009
Mesenchymal Stem Cell Growth Medium 2 (Ready-to-use), phenol red-free	500 ml	C-28017
Mesenchymal Stem Cell Growth Medium XF * (Ready-to-use)	500 ml	C-28019
Mesenchymal Stem Cell Growth Medium XF * (Ready-to-use), phenol red-free	500 ml	C-28018
PromoExQ MSC Growth Medium XF * (Manufactured in compliance with the EXCiPACT™ GMP certification standard)	500 ml	EQ-C-28019

* Fibronectin- or vitronectin-coated plates are necessary in conjunction with the xeno-free (XF) media

Select the right MSC media for your research needs

The formulation of cell culture media can affect the phenotypic characteristics and functional properties of MSCs. Therefore, cell culture media should be selected carefully, depending on the intended research application, to ensure that MSCs exhibit optimal growth and differentiation potential. Our portfolio of specialized MSC cell growth media includes low-serum, phenol red-free, xeno-free, and Excipient GMP-grade formulations.

MSC growth media overview

Media	Serum-free	Xeno-free	Phenol red free	Excipient GMP grade
 Mesenchymal Stem Cell Growth Medium 2 (Ready-to-use)	Low serum			
 Mesenchymal Stem Cell Growth Medium 2 (Ready-to-use), phenol red-free	Low serum		✓	
 Mesenchymal Stem Cell Growth Medium XF * (Ready-to-use)	✓	✓		
 Mesenchymal Stem Cell Growth Medium XF * (Ready-to-use), phenol red-free	✓	✓	✓	
 PromoExQ MSC Growth Medium XF * (Manufactured in compliance with the EXCiPACT™ GMP certification standard)	✓	✓	**	✓

* Fibronectin- or vitronectin-coated plates are necessary in conjunction with the xeno-free (XF) media
*** Contact us for customized formulations*

Cell detachment and cryopreservation

Cryo-SFM Plus

Our Cryo-SFM Plus is an animal-free and protein-free cryopreservation medium that ensures improved cell viability and adhesion after thawing. Its antioxidant technology protects cells from damage during the freezing and thawing process, maintaining their structural integrity and functionality. Ensuring maximum cell recovery after thawing is particularly important for sensitive cell types, such as MSCs.

Key benefits

- Ready-to-use
- Purified proteolytic and collagenolytic enzymes
- Ensure unchanged cell surface
- Antioxidant technology preserves viability, attachment, and growth
- Maximum cell recovery after thawing
- Minimizing freeze-induced stress, preserving cell viability and integrity
- Powered by patented technology.

Accutase Solution

Our Accutase-Solution is a sterile, filtered, ready-to-use detachment solution developed for gentle and effective detachment of adherent cells. The solution contains proteolytic and collagenolytic enzymes that efficiently break down cell-cell and cell-matrix adhesions without damaging cell surface proteins. This formulation is ideal for the dissociation of sensitive cell types, including MSCs.

Functional analysis

According to the International Society for Stem Cell Research (ISSCR) and International Society for Cellular Therapy (ISCT), for cells to be considered MSCs, they must adhere to plastic surfaces in culture, express specific surface markers (e.g., CD105, CD73, and CD90), lack expression of certain markers (e.g., CD45, CD34, and HLA-DR), and demonstrate the ability to differentiate into osteoblasts, adipocytes, and chondroblasts *in vitro*. Functional analysis, including cell differentiation and surface marker expression, plays a crucial role in ensuring MSC identity and functionality by demonstrating multipotency and adherence to established marker profiles.

MSC multipotency

We offer specialized cell culture media for tri-lineage differentiation of MSCs. Additionally, neurogenic differentiation is possible using our ready-to-use Neurogenic Differentiation medium.

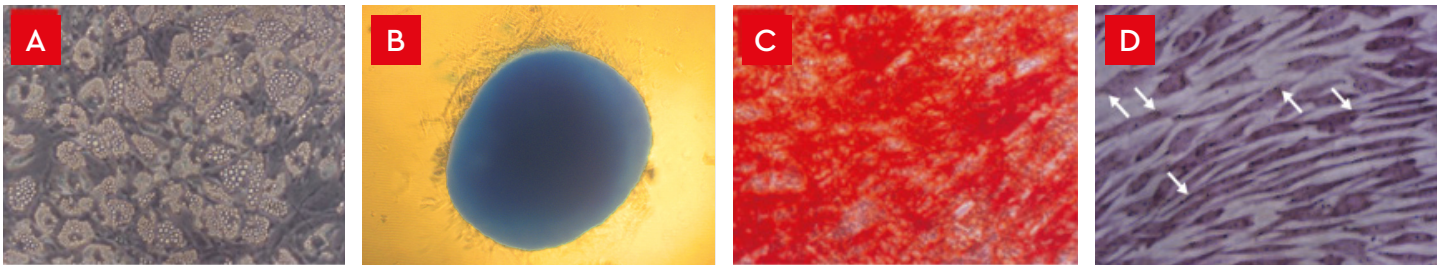


Fig. 3: Differentiation potential of human bone marrow-derived MSCs, consistent with the ISCT guidelines. A) *Lipid vesicle accumulation in adipocytes.* ***B)*** *Alcian Blue staining shows cartilage differentiation with blue-stained extracellular matrix.* ***C)*** *Alizarin Red S staining highlights calcium deposits in mature osteoblasts.* ***D)*** *Neuronal cells differentiated from MSC show extensive Nissl bodies stained dark black-violet (white arrows).*

MSC Differentiation Media

Product 	Size	Cat. No.
MSC Adipogenic Differentiation Medium 2 (Ready-to-use)	100 ml	C-28016
Mesenchymal Stem Cell Chondrogenic Differentiation Medium (Ready-to-use) with or without inducers	100 ml each	C-28012/ C-28014
Mesenchymal Stem Cell Osteogenic Differentiation Medium (Ready-to-use)	100 ml	C-28013
Mesenchymal Stem Cell Neurogenic Differentiation Medium (Ready-to-use)	100 ml	C-28015

MSC marker expression

Marker expression analysis is crucial for MSC identification and isolation from heterogeneous cell populations. According to the ISCT criteria, MSCs are characterized by the expression of CD105, CD73, and CD90. In contrast, CD45, CD34, CD14, CD19, and HLA-DR must not be expressed for cells to be considered MSCs. Our hMSCs comply with these ISCT marker requirements.

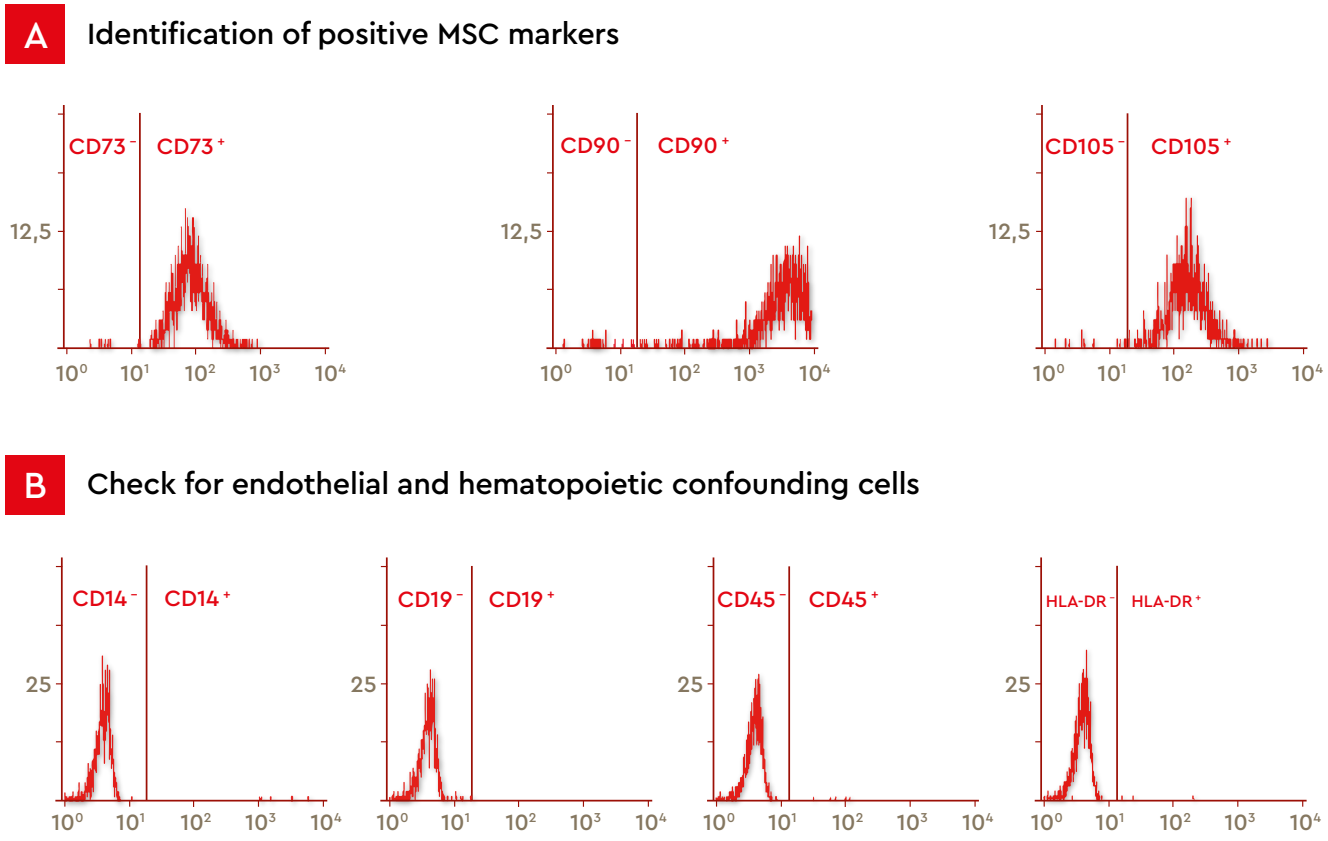


Fig. 4: Flow cytometry analysis of our human primary MSCs isolated from bone marrow. A) *Histograms showing expression of CD73, CD90, and CD105. MSCs represent a defined population that is positive for these markers.* ***B)*** *Histograms showing expression of CD14, CD19, CD45, and HLA-DR. MSCs are negative for these endothelial and hematopoietic cell markers. The expression profile of our primary MSCs conforms to the ISCT guidelines.*

MSC culture system

- MSCs with verified expression of surface markers that meet the ISCT criteria
- Standardized and well-characterized MSCs for reproducible research
- Possibility of large-scale production of various types of hMSCs isolated using ISCT standards
- Confirmed differentiation into osteoblasts, adipocytes, and chondrocytes
- Culture in our optimized MSC medium ensures expression of trilineage surface markers
- Custom MSC media according to your needs and regulatory requirements
- Excipient GMP-grade MSC media

Discover more

Visit: www.promocell.com/research-areas/stem-cell-research

Contact us

Do you need cells from a specific donor type or from an already HLA-typed donor?
Contact us and let us know your donor requirements: info@promocell.com

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