

# HUMAN BONE MARROW PRODUCTS

## to Streamline Your Cell-Based Assays

Human bone marrow (BM) is a rich source of human primary cells, including hematopoietic stem and progenitor cells (HSPCs) as well as stromal cells or mesenchymal cells (MSCs). Stromal cells, such as adipocytes, endothelial cells, fibroblasts, osteoblasts, osteoclasts, and macrophages, are not directly involved in hematopoiesis, whereas the hematopoietic stem cells, such as leukocytes, erythrocytes, and platelets, are responsible for the production of blood cells.

Human primary cells derived from BM retain key aspects of the tissue of origin and reflect donor variability more accurately than cell lines, including human leukocyte antigen (HLA) type and cytomegalovirus (CMV) status. Their use in assays increases the physiological relevance of cell culture systems, enabling you to generate meaningful data that is more predictive of in vivo outcomes. This approach reduces the need for extensive in vivo validation and helps to facilitate the translation of basic research into preclinical or clinical applications. Moreover, bone marrow-derived CD34<sup>+</sup> HSPCs and MSCs also offer an attractive stem cell platform to develop screening assays for new target and drug candidate discovery.

BM is collected from adult donors using heparin as the anticoagulant. Large numbers of cryopreserved mononuclear cells (MNCs) and HSPCs are isolated from full bone marrow collections of approximately 100 mL. Save time by letting us characterize your cells with services that include high-resolution HLA typing (Class I and II), CMV status, EBV status, and vaccination status. BM donors may be available for subsequent collections, ensuring consistency across multiple experiments. With personalized service, custom products, flexible delivery times, and the option to reserve entire lots to prescreen cells for applications, we help you get the cells you need.



### RESOURCE

Frequently Asked Questions on Primary Cells  
[www.stemcell.com/primarycellsfaq](http://www.stemcell.com/primarycellsfaq)

### Why Use Human Primary Cells?

**PHYSIOLOGICALLY RELEVANT.** Choose cells that are more physiologically representative of cells in vivo.

**ETHICALLY SOURCED.** Access donor samples collected using regulatory authority-approved consent forms and protocols.

**CONVENIENT.** Start your experiments on your schedule without being restricted by the availability of tissue.

**ACCESSIBLE.** Obtain large lots of rare cell populations, including hematopoietic stem and progenitor cells.

**CUSTOMIZABLE.** Request custom products for non-standard cell types or collections with specific requirements.

**FLEXIBLE.** Reserve large numbers of cryopreserved cells while you test them in your specific applications.

**EFFICIENT.** Reduce time spent collecting and culturing primary cells.



**Figure 1. Fresh Whole Bone Marrow**

Whole Bone Marrow (Catalog #70502) is collected using heparin as the anticoagulant and supplied in a 100 mL bottle.

## Whole Bone Marrow

Fresh whole bone marrow is available in volumes of 25 mL, 50 mL, and 100 mL. Each size is supplied in a 100 mL bottle for convenient downstream processing (Figure 1).

## Mononuclear Cells

BM MNCs are obtained by density gradient centrifugation of the whole bone marrow and cryopreserved in CryoStor® CS10. MNCs can be used for the enumeration of multipotential and lineage-committed HPCs in the CFU assay (Figure 2).

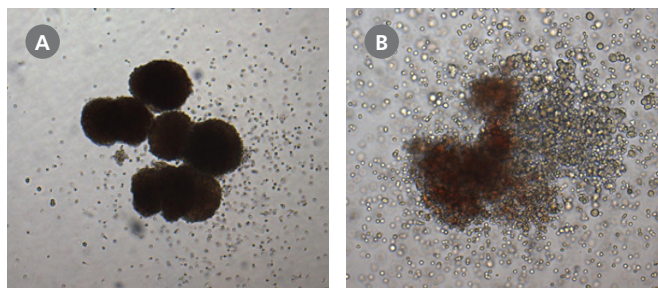
## Hematopoietic Stem and Progenitor Cells

BM CD34<sup>+</sup> cells are isolated from MNCs and cryopreserved using StemSpan™ Serum-Free Expansion Medium (SFEM) (Catalog #09650) with 10% DMSO. BM CD34<sup>+</sup> cells are ideal for use in the CFU assay, which may be used to identify potential hematotoxicity of drug candidates *in vitro*.

## Stromal Cells (MSCs)

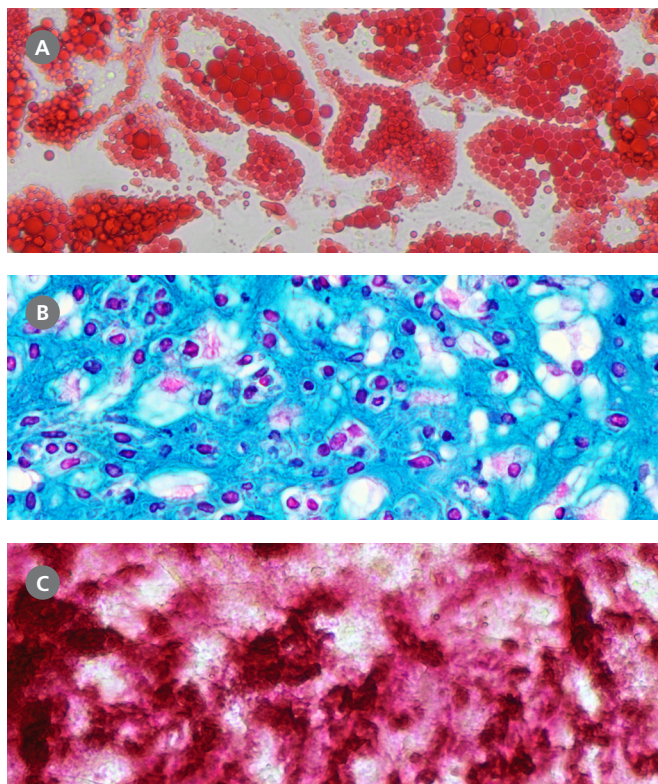
BM stromal cells, also termed mesenchymal stem cells (MSCs), are fibroblast-like cells isolated from bone marrow MNCs. MSCs can also be isolated from other sources, including adipose, dental pulp, and umbilical cord tissues. MSCs are characterized by their ability to differentiate into adipocytes, chondrocytes, and osteoblasts *in vitro*.

Obtain MSCs derived from bone marrow MNCs, expanded for one passage using the MesenCult™-ACF Plus Culture Kit and cryopreserved in CryoStor® CS10 (Catalog #07930) without the use of serum containing reagents, in a complete, animal component-free (ACF) culture condition (Figure 3). MSCs derived from bone marrow in ACF culture medium show greater expansion capacities while maintaining robust multi-lineage differentiation potential *in vitro* compared to MSCs derived in fetal bovine serum (FBS)-containing culture medium. As many as 100 vials of  $7.5 \times 10^5$  cells per vial are available per lot, making it possible to reserve large numbers of cells while you evaluate them in your specific applications, thereby reducing the need for repeated lot screening. Alternatively, researchers can also obtain MSCs derived under serum-containing culture conditions using the FBS-containing MesenCult™ Proliferation Kit.



**Figure 2. Cryopreserved Bone Marrow MNCs Generate Hematopoietic Colonies in CFU Assays**

Bone Marrow MNCs (Catalog #70001) were cultured in MethoCult™ H4034 Optimum Medium (Catalog #04034) for 14 days. Hematopoietic progenitor cells within the MNC population generated multiple colonies derived from colony-forming unit-granulocyte, erythroid, macrophage, megakaryocyte (CFU-GEMM). Colonies shown here were imaged on day 14 using a (A) 4X objective and (B) 10X objective, respectively.



**Figure 3. Cryopreserved Bone Marrow Stromal Cells Cultured in MesenCult™-ACF Medium Maintain Robust Multi-Lineage Potential**

Human bone marrow stromal cells derived in ACF medium (Catalog #70071) using the MesenCult™-ACF Plus Culture Kit differentiate to (A) adipocytes (Oil Red O staining), (B) chondrocytes (Alcian Blue and Nuclear Fast Red staining), and (C) osteoblasts (Alizarin Red S staining) using the appropriate MesenCult™ differentiation kits.

## ThawSTAR® CFT2 Automated Thawing System

Standardize your thawing process using the ThawSTAR® CFT2 Automated Thawing System (Catalog #100-0650)—a sensor-based, water-free instrument that delivers cell thawing profiles similar to those of a water bath. Conveniently thaw your cells in the biosafety cabinet, in ~2.5 minutes, while you prepare for the next step in your experiment.



**Figure 4.** ThawSTAR® CFT2 Automated Thawing System

ThawSTAR® CFT2 Automated Thawing System (Catalog #100-0650)—Automated cell thawing system for consistent thawing performance.

## Quality, Ethically Sourced Human Primary Cells

All human primary cell products are ethically sourced using Informed Consent Forms (ICFs) and protocols approved by either an Institutional Review Board, the Food and Drug Administration (FDA), the U.S. Department of Health and Human Services, and/or an equivalent regulatory authority. Donations are performed in the United States in compliance with applicable federal, state, and local laws, regulations, and guidance. Donors are pre-screened for general health and viral status, including HIV-1, HIV-2, hepatitis B, and hepatitis C. Additional screening or analysis is available upon request.

Most purified cells are isolated using column-free cell isolation technology and cryopreserved in defined, serum-free media. State-of-the-art equipment, including automated cryogenic storage systems and cryogenic sample carriers, ensure cold chain custody management and high sample integrity. Cells are shipped with a Certificate of Analysis indicating guaranteed Quality Control testing results, including cell count, viability, and purity. STEMCELL's Quality Management System is certified to ISO 13485, Medical Devices.



For a complete listing of bone marrow primary cell products, please visit [www.stemcell.com/cells-bone-marrow](http://www.stemcell.com/cells-bone-marrow).

## Product Information\*

### Cryopreserved Bone Marrow Cells<sup>1,2,4,6</sup>

Description	Quantity	Catalog #
Mononuclear Cells	5 million cells	70001.1
	15 million cells	70001.2
	25 million cells	70001
	50 million cells	70001.3
	100 million cells	70001.4
CD34 <sup>+</sup> Cells	0.1 million cells	70002.1
	0.3 million cells	70002.2
	0.5 million cells	70002.3
	1 million cells	70002
	2 million cells	70002.4
	5 million cells	70002.5
CD36 <sup>+</sup> Cells <sup>3</sup>	1 million cells	70003
CD33 <sup>+</sup> Cells	5 million cells	70006
Stromal Cells Derived in ACF Plus Medium <sup>3</sup>	0.75 million cells	70071

### Fresh Whole Bone Marrow<sup>1,5</sup>

Description	Quantity	Catalog #
Whole Bone Marrow	≥ 25 mL	70502.2
	≥ 50 mL	70502.1
	≥ 100 mL	70502

### Cell Thawing Instrument<sup>7</sup>

Product	Catalog #
ThawSTAR® CFT2 Automated Thawing System	100-0650
ThawSTAR® CFT2 Transporter	100-0642
ThawSTAR® CFT2 Confirmation Vials	100-0643
ThawSTAR® CFT2 IOPQ Kit	100-0730

1 Heparin is added to the bone marrow upon collection as an anticoagulant.

2 High-resolution HLA typing and CMV status are available upon request.

3 Cultured Cell Product.

4 Cryopreserved Products: Donors are screened for HIV-1, HIV-2, hepatitis B, and hepatitis C. If the donor has tested negative within 90 days prior to donation, the product will be shipped with the negative test result and date of the most recent viral testing on the Certificate of Analysis (CoA).

5 Fresh Products: Donors are screened for HIV-1, HIV-2, hepatitis B, and hepatitis C. If the donor has been screened within 90 days prior to donation and the results are negative, the product will be shipped with the negative test result and date of the most recent viral testing on the CoA. If the donor has not been screened within 90 days prior to collection, a test sample will be taken at the time of collection and the product will be shipped before the screening results are available. In the event that a test result is positive, the customer will be contacted as soon as possible (usually within 2 - 4 business days from the time of shipment).

6 Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support ([techsupport@stemcell.com](mailto:techsupport@stemcell.com)) for further information.

7 ThawSTAR® CFT2 is not available for sale in China, Hong Kong, Taiwan, Japan, or South Korea.



## VIDEO

How to Thaw Frozen Human Primary Cells  
[www.stemcell.com/thaw-frozen-cells.html](http://www.stemcell.com/thaw-frozen-cells.html)



## CONTACT US

Contact Human Primary Cell Team  
[www.stemcell.com/contact-primary-cells.html](http://www.stemcell.com/contact-primary-cells.html)

For more information on how we can support your custom requests, shipping requirements, and more, visit [www.stemcell.com/primarycells](http://www.stemcell.com/primarycells) or contact your local STEMCELL representative.

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