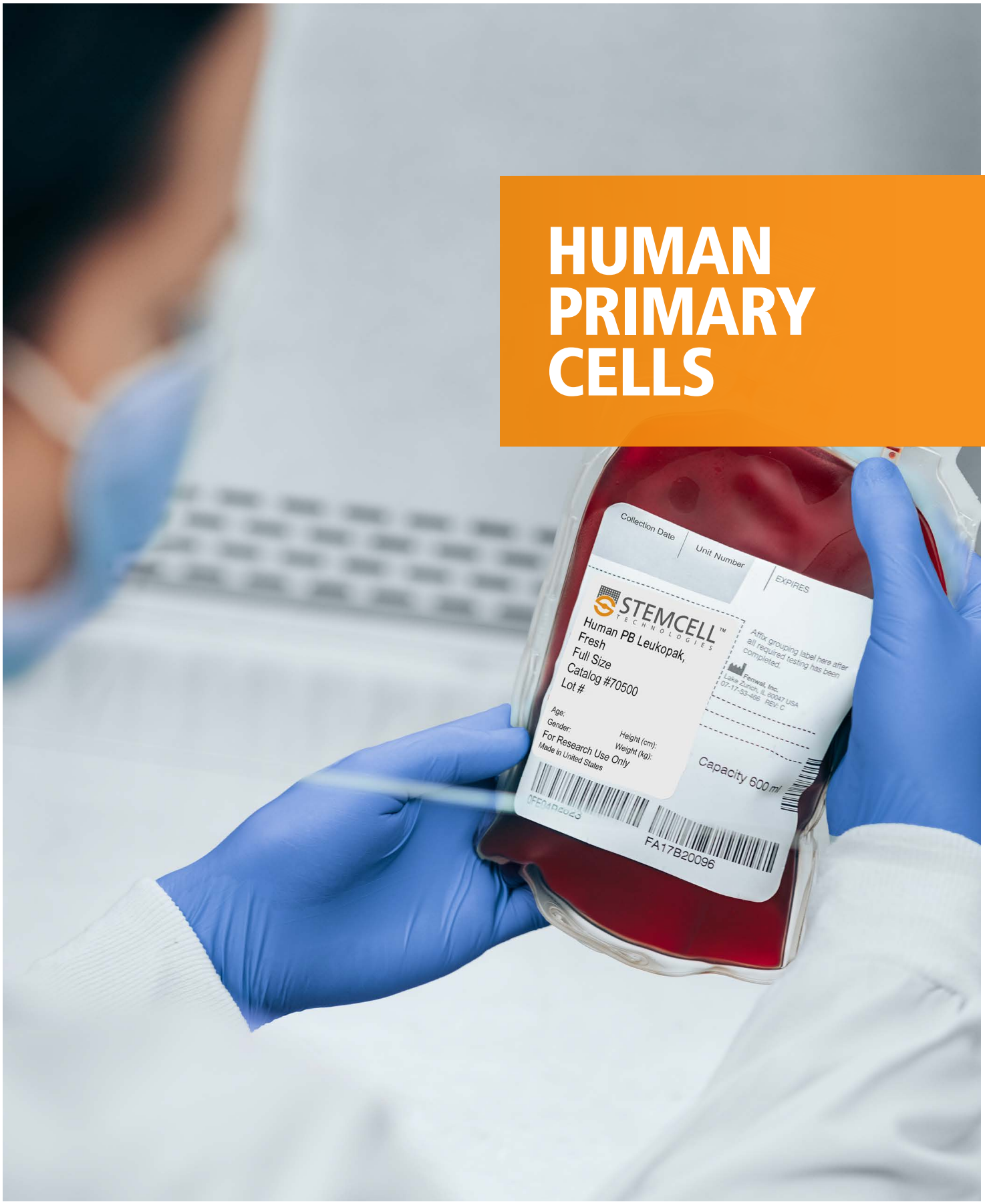
HUMAN PRIMARY CELLS



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Human Primary Cells

To Streamline Your Cell-Based Assays

Human primary cells are cells isolated directly from tissues, including blood and bone marrow. These cells are increasingly recognized for their importance in the study of biological processes, disease progression, and drug development, and for applications such as in vitro cell-based assays, xenograft creation, and humanized mouse models.

Explore your options for ready-to-use fresh or cryopreserved cells from STEMCELL Technologies, including mononuclear cells (MNCs), purified immune cells, or stem cells isolated from blood or bone marrow*.

Customized for Your Needs

Custom products are available upon request for non-standard cell types or collections with specific requirements. Additional customization includes different formats, volumes, or sizes. Custom products include:

- Rare or difficult-to-isolate hematopoietic cell types (normal** and diseased, including cells from patients with autoimmune diseases, diabetes, asthma, cancer, etc.)
- Cells that meet specific donor recruitment criteria
- Collections obtained using alternative anticoagulants
- Products in alternative size formats, e.g. bags, vial sizes, requested cell counts, etc.
- Donor-matched collections for fresh and/or cryopreserved cells, e.g. whole blood, leukopaks, isolated cells, plasma, serum, etc. from the same donor

Flexible Delivery Options

Start experiments according to your schedule by choosing from our flexible delivery options. Schedule your collection and delivery of fresh cells* at your convenience with our customer service representatives (freshcellorders@stemcell.com). Early morning delivery is available for customers based in the United States, and same-day delivery is available in select regions. Please consult your sales representative for delivery options available in your region.

Flexible Hold Policy

Place products of interest on hold, whether of a specific cell type or sample size, or products from a particular donor. Batches are held until you have completed your testing within the stipulated hold period (< 3 months). If necessary, holds can be extended for up to three months, completely free of charge. However, if you anticipate holding the cells beyond three months, a storage fee may apply, calculated as a recurring monthly charge based on the total hold value. Please refer to the terms and conditions (available online via the STEMCELL homepage) and contact your sales representative for more information on holds.

Why Use Human Primary Cells from STEMCELL Technologies?

EFFICIENT. Reduce time spent collecting and culturing primary cells.

CONVENIENT. Reserve large numbers of cryopreserved cells and start experiments on your schedule with cells you've already tested.

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

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.

Shipping Options

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 13485:2016 Medical Devices and ISO 9001:2015. Fresh cells are shipped at temperatures specific to the product type: normal, diseased, and mobilized leukopaks are shipped at 2 - 8°C, except for same-day deliveries of fresh and diseased leukopaks, which are shipped at ambient temperatures. Fresh bone marrow and whole blood samples are shipped at ambient temperatures. Frozen cell products are shipped on dry ice, with liquid nitrogen shipping available upon request.

Resource

Human Primary Cells Overview
www.stemcell.com/primarycells

*Certain fresh and cryopreserved products are only available in select territories. Please contact your Sales representative or Product and Scientific Support (techsupport@stemcell.com) for further information.

**Donors in our normal donor pool are first pre-screened using a health questionnaire to exclude any donors with certain diseases, such as blood disorders or other health concerns. While most diseases and conditions are self-reported, donors are tested for specific infectious diseases, including, but not limited to, HIV-1, HIV-2, hepatitis B, and hepatitis C, as well as other parameters such as temperature and blood pressure. These are all overseen by a medical director at each collection site. For specific donor requirements, please contact us by emailing orders@stemcell.com.

We Help You Get the Cells You Need

Your Trusted Partner

All human primary cell products are ethically sourced using consent forms and protocols approved by either an Institutional Review Board, the U.S. Food and Drug Administration, the U.S. Department of Health and Human Services, and/or an equivalent regulatory authority. Donations performed in the United States comply with applicable federal, state, and local laws, regulations, and guidance. Cells sourced in the United Kingdom are collected using protocols and informed consent forms (ICFs) approved by the National Health Service (and Health Research Authority) Research Ethics Committee (REC) or equivalent agency. Donors are prescreened for general health and viral status, including HIV-1, HIV-2, hepatitis B, and hepatitis C (see Donor Viral Screening Policy on page 24 for more information). Additional screening or analysis is available upon request. Our Quality Assurance, Quality Control, and Regulatory Affairs departments are ready to assist you with any necessary documentation to meet specific institutional requirements.

Characterization Services

STEMCELL's Contract Assay Services (CAS), established as an independent contract resource organization (CRO), specializes in primary cell-based assays (see page 23). CAS has performed studies for over 120 pharmaceutical, biotechnology, government, and academic life science organizations worldwide, providing exceptional service through frequent communication, quality products, and unparalleled expertise. CAS supports your complex research projects with cell products customized to your specific requirements, including characterization test results of cell lots of interest. These characterization services include:

- **Viral screening:** lymphocytic choriomeningitis virus (LCMV) status, cytomegalovirus (CMV) status, Epstein-Barr virus (EBV) status, vaccination status, and others may be requested
- **High-resolution human leukocyte antigen (HLA) typing:** Class I and II
- **Blood type:** ABO/Rh factor
- **Genotyping:** CD16, CD32, Killer Ig-Like Receptors (KIR)
- **Phenotyping or Flow Cytometry Analysis**

Flow Cytometric Assessment of Your Chosen Cells

Analyze the composition of hematopoietic stem cell populations present, including megakaryocytes, myeloid, and erythroid cells, using our flow cytometry services (Figure 1).

Genotyping

At STEMCELL, cells are genotyped for CD16 and CD32, the two most-studied Fc receptors found in NK cells. Single nucleotide polymorphisms (SNPs) can occur to CD16 and CD32, causing cells such as NK cells to have higher binding capacity to the target cells' IgG, leading to stronger target cell killing. STEMCELL also genotypes for killer-cell immunoglobulin-like receptors (KIR, CD158), a family of transmembrane glycoproteins expressed on NK cells and a minority of T cells. Genotyping for this receptor provides insight into variations within individuals and their susceptibility to certain diseases.

HLA Typing

HLA type can be requested for most primary cell products. The HLA results are obtained using sequence-based typing, sequence-specific oligonucleotide probes (SSOP), and/or sequence-specific primers (SSP), as needed, to obtain the required resolution. For fresh leukopaks in the U.K., HLA analysis is performed by an ASHI (American Society of Histocompatibility and Immunogenetics) accredited lab. Please be advised that requests for HLA data incur an additional fee.

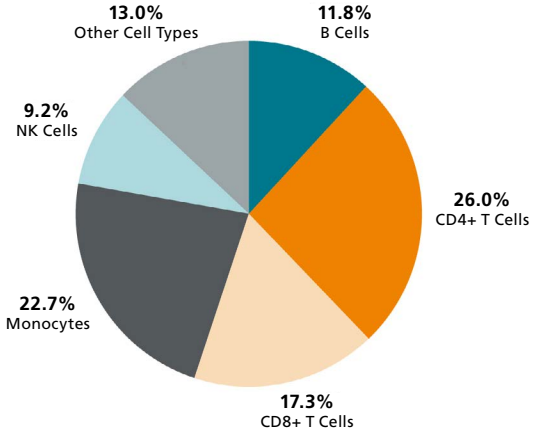


Figure 1. Mean Percentages of Cell Subpopulations in Cryopreserved Peripheral Blood Mononuclear Cells

Representative chart showing the average frequencies of major immune subsets in cryopreserved peripheral blood mononuclear cell (PBMC) products, as measured by flow cytometry post-thaw. Values shown are mean percentages of total viable leukocytes present in PBMCs ($n \geq 183$).

Resource

Frequently Asked Questions on Primary Cells
www.stemcell.com/primarycellsfaqs

Peripheral Blood Cells

Peripheral blood is an abundant source of immune cells, including granulocytes, monocytes, and lymphocytes. Fresh collections, including leukopaks, LRS cones, and whole blood, are ideal starting materials for performing cell isolation using manual or automated immunomagnetic and column-free EasySep™ cell isolation kits. Alternatively, cryopreserved, purified peripheral blood cells are ready to use—ensuring you save time and can begin experiments when you are ready.

Whole Peripheral Blood

Choose from a range of volumes and anticoagulants of whole peripheral blood. Small volumes (< 100 mL) and large volumes (≥ 450 mL) are collected and supplied in 10 mL Vacutainer® tubes and collection bags, respectively, using acid citrate dextrose solution A (ACDA), ethylenediaminetetraacetic acid (EDTA), or sodium heparin (Na heparin) as an anticoagulant. High-resolution HLA typing is available upon request. To isolate your cell subset of interest from whole blood, combine SepMate™ tubes with a wide range of RosetteSep™ cell isolation kits to obtain untouched and highly purified cells in as little as 25 minutes. You can also isolate cells directly from whole blood with EasySep™ Direct in as little as 20 minutes.

Leukopaks

Leukopaks are highly concentrated, low-volume apheresis collections that primarily contain peripheral blood mononuclear cells (PBMCs). Leukopaks are an ideal starting material for downstream isolation of large numbers of cells, reducing the time and reagents needed to process cells of interest. Leukopaks are collected using the Spectra Optia® Apheresis system, with one full leukopak collection being equivalent to approximately three blood volumes. A full-size leukopak typically contains greater than 9 billion cells in an average volume of < 200 mL. Fresh or frozen leukopaks are available in full, half, quarter, and tenth sizes. Additionally, fresh and frozen leukopaks collected from donors diagnosed with a solid tumor cancer, hematological cancer, autoimmune disease, or inflammatory disease are also available in various sizes.

For large-scale isolation of human CD34+ cells from mobilized leukopaks, see the large-format ($1x10^{10}$ cells) EasySep™ Human CD34 Positive Selection Kit II (Catalog #100-1569). Easily and efficiently scale up your manual cell isolations from large-volume samples with the Easy 250 EasySep™ Magnet (Catalog #100-0821).

LRS Cones or LRS Chambers

Leukocyte Reduction System (LRS) cones, also known as LRS chambers, are used during the collection of apheresis products to reduce the leukocyte count from human blood collections (e.g. platelet collections). The LRS cone is the chamber that collects the leukocytes—providing a small-volume, granulocyte-reduced, concentrated source of primary human leukocytes. LRS cones can then be further processed using cell separation, such as with EasySep™ Cell Isolation Kits, to purify cell populations for study.

Figure 2. Fresh Whole Peripheral Blood Collected with ACDA

Fresh Whole Peripheral Blood (Catalog #70504) is available in collection bags using ACDA, EDTA, or Na heparin as the anticoagulant.

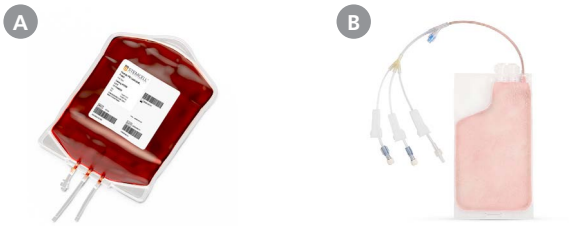


Figure 3. Fresh and Frozen Human Peripheral Blood Leukopak - Full-Size

(A) Fresh Leukopak (Catalog #70500) and (B) Frozen Leukopak (Catalog #200-0130) from a normal donor containing peripheral blood mononuclear cells (PBMCs) enriched using the Spectra Optia® Apheresis System.

Figure 4. LRS Cone

LRS Cone (Catalog #200-0093) containing primary human leukocytes.

Product

Easy 250 EasySep™ Magnet

www.stemcell.com/easy-250-easysep-magnet.html

Webinar

Leukopak Processing: Tips & Tricks for Streamlined Cell Isolation

www.stemcell.com/leukopak-processing-webinar

Peripheral Blood Mononuclear Cells

Peripheral blood mononuclear cells (PBMCs) include lymphocytes, monocytes, dendritic cells, and hematopoietic progenitors. Large lots of fresh and cryopreserved PBMCs and purified cells are produced by processing entire full-size leukopaks. PBMC lot sizes are typically greater than 50 vials of 1 x 10^8 cells per vial, making it possible to hold large numbers of vials from the same lot and ensure consistency across multiple experiments.

Figure 5. Human Peripheral Blood Mononuclear Cells, Frozen

Primary human mononuclear cells (MNCs) (Catalog #70025) are isolated from peripheral blood (PB) leukapheresis samples using density gradient separation and/or red blood cell lysis.

Diseased-State PBMCs

Access cryopreserved PBMCs isolated from donors with:

- **Autoimmune and inflammatory disorders:** amyotrophic lateral sclerosis (ALS), ankylosing spondylitis, autoimmune hepatitis, celiac disease, Crohn's disease, Graves' disease, Hashimoto's disease, Hidradenitis suppurativa, inflammatory myopathy, irritable bowel syndrome (IBS), lupus, myasthenia gravis, multiple sclerosis, osteoarthritis, psoriasis, rheumatoid arthritis, scleroderma, Sjogren's syndrome, type 1 interferonopathy, ulcerative colitis, vasculitis, and others
- **Cancers:** hematopoietic malignancies, including acute myeloid leukemia (AML), myelofibrosis (MF), diffuse large B cell lymphoma (DLBCL), follicular lymphoma (FL), multiple myeloma (MM), chronic myelogenous leukemia (CML), acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL), and mantle cell lymphoma (MCL), and solid tumors, including liver, lung, breast, cervical, melanoma, ovarian, bladder, prostate, esophageal, colorectal, head & neck, gastric, kidney, pancreatic, and endometrial cancers
- **Diabetes:** Type I and Type II
- **Lung disorders:** asthma and chronic obstructive pulmonary disease (COPD)

Video

How to Thaw Frozen Human Primary Cells

www.stemcell.com/how-to-thaw-frozen-human-primary-cells.html

Normal PBMCs

Obtain PBMCs from a large donor pool in convenient sizes, with high-resolution HLA typing (A, B, C, DRB1, DRB3/4/5, and DQB1) and CMV status available upon request. Now available for specific lots, the standard flow cytometry panel provides the exact frequencies of common cell types in each vial of PBMCs.

Figure 6. Diseased Human Peripheral Blood Products

Diseased human PBMCs from donors diagnosed with cancer, such as lung cancer, may be obtained in various formats, including (A) PBMCs, Frozen (Catalog # 200-0214), (B) Peripheral Blood Leukopak Collection, Fresh (Catalog #200-0300), and (C) Whole Peripheral Blood Collection, Heparin, Fresh (Catalog #200-0270). Collections are obtained using Institutional Review Board (IRB)-approved consent forms and protocols.

Peripheral Blood Products

Plasma

Human plasma is the liquid component of blood and contains water, salts, lipids, hormones, proteins (including albumin), immunoglobulins, clotting factors, and fibrinogen. Our isolated plasma does not contain the cellular components of blood—i.e. erythrocytes and the buffy coat that is composed of leukocytes and platelets. Obtain fresh or frozen primary human plasma isolated from peripheral blood using centrifugation. Peripheral blood is collected using acid-citrate-dextrose solution A (ACDA) as an anticoagulant.

Serum

Human serum is the fluid portion of blood that is left after coagulation has removed clotting factors/fibrinogen and cellular components. Serum contains water, proteins, electrolytes, antibodies, antigens, hormones, and other substances. Fresh or frozen primary human serum is isolated from normal donor peripheral blood after coagulation and removal of the fibrin clot and blood cells.

Human Platelet Lysate, Fibrinogen-Depleted, GMP-Compliant

Start experiments confidently with a reliable supply of ethically sourced, GMP-compliant, fibrinogen-depleted human platelet lysate (hPL) for the expansion of cells in vitro. An alternative to fetal bovine serum (FBS), this growth factor-rich cell culture supplement is derived from healthy donor human platelets. We have also recently launched our Human Platelet Lysate, Fibrinogen-Depleted, XF, a completely xeno-free, fibrinogen-depleted hPL to improve cell culture performance. Heparin is not added during the manufacturing process and is not required for use of the xeno-free and GMP-compliant hPL products. Refer to page 11 for a list of all types of hPL products provided by STEMCELL.

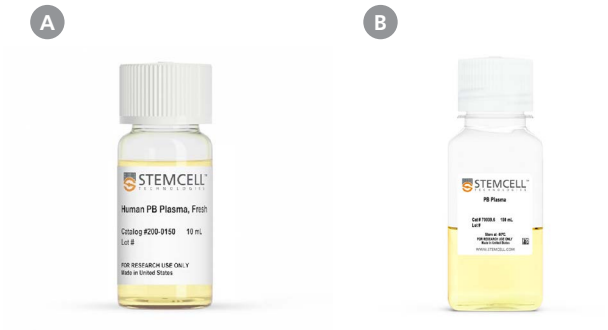


Figure 7. Fresh and Frozen Human Peripheral Blood Plasma

(A) Fresh human plasma (Catalog # 200-0150) and (B) frozen human plasma (Catalog # 70039) isolated from peripheral blood using centrifugation.

Figure 8. Frozen Human Platelet Lysate, Fibrinogen-Depleted, GMP-Compliant

Human Platelet Lysate, Fibrinogen-Depleted, GMP-Compliant (Catalog # 200-0322) is a growth factor-rich cell culture supplement derived from healthy donor human platelets.

For a complete listing of peripheral blood primary cell products, please visit www.stemcell.com/cells-peripheral-blood.

Purified Immune Cells

Cryopreserved purified immune cells are isolated from peripheral blood using EasySep™ cell isolation kits with guaranteed viability and purity verified in the lot-specific Certificate of Analysis. Cells are immediately ready for use, eliminating the need to perform downstream cell isolation. Choose from a wide range of cell types and ensure optimal activation, expansion, and differentiation using ImmunoCult™ medium, activators, supplements, and more. High-resolution HLA typing is available upon request.

Natural Killer Cells

Natural killer (NK) cells are a subset of innate immune cells with high cytolytic activity, releasing cytotoxic granules to target infected or cancerous cells for elimination. NK cells also produce immunoregulatory cytokines that modulate the adaptive immune response and are therefore of high interest in cancer and viral immunotherapy research.

T Cells

T cells are lymphocytes that originate in the bone marrow and migrate to the thymus to undergo maturation. T cells are essential in the adaptive immune response and there is particular interest in genetically engineering these cells for therapy against cancer and other diseases. There are several subsets of T cells, including naïve and memory helper T cells, cytotoxic T cells, and regulatory T cells. Choose from a range of cryopreserved T cells and subsets, including pan-T cells, naïve pan-T cells, Th17 T cells, CD4+ T cells, CD8+ T cells, CD8+ Memory T cells, CD4+CD25- T cells, CD4+CD45RA+ T cells, CD4+CD45RO+ T cells, CD4+CD25+CD127^{low} T cells, CD4+CD25+CD127^{low}FOXP3+ T cells, and CD8+CD45RA+ T cells.

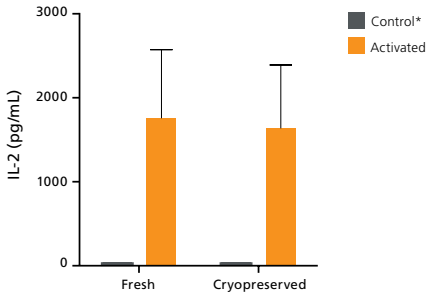


Figure 9. Cryopreserved Pan-T Cells Secrete IL-2 Upon Activation

T cells freshly isolated from a leukopak (Catalog #70500) using EasySep™ Human T Cell Isolation Kit (Catalog #17951) or cryopreserved Pan-T Cells (Catalog #70024) were cultured in ImmunoCult™-XF T Cell Expansion Medium (Catalog #10981) and incubated for 48 hours with or without ImmunoCult™ Human CD3/CD28 T Cell Activator (Catalog #10971). Freshly isolated and cryopreserved purified T cells secrete similar levels of IL-2 upon activation, as measured using the Human IL-2 ELISA Kit (Catalog #02006).

*IL-2 concentration of control in culture was lower than the limit of detection.

Monocytes

Monocytes are precursors of macrophages and DCs that originate in the bone marrow and are released into the peripheral blood. Monocytes play an important role in immune surveillance, host defence, tissue remodeling, and repair, and have also been implicated in many inflammatory diseases.

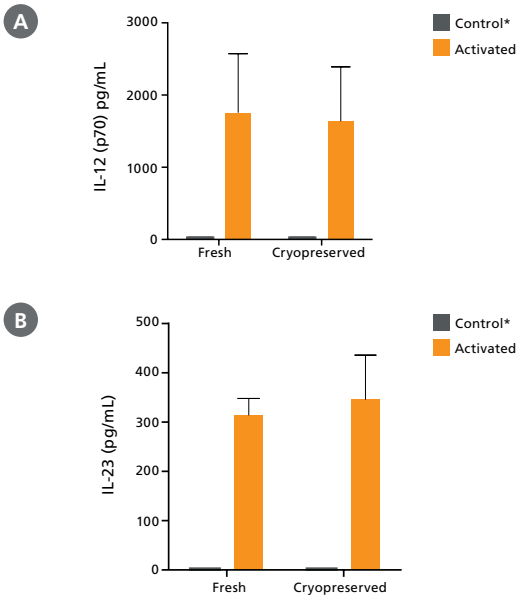


Figure 10. Cryopreserved Monocytes Differentiate into Dendritic Cells and Secrete IL-12 (p70) and IL-23 Upon Activation

Monocytes freshly isolated from a leukopak (Catalog #70500) using EasySep™ Human Monocyte Isolation Kit (Catalog #19359) or cryopreserved monocytes (Catalog #70034) were cultured for 6 days in RPMI 1640 Medium (Catalog #36750) with 10% FBS, 0.1 mM MEM Non-Essential Amino Acid Solution (100X, Catalog #07600), 2 mM L-Glutamine (Catalog #07100), 1 mM Sodium Pyruvate, and 50 µM β-mercaptoethanol. Human Recombinant IL-4 (Catalog #78045) and Human Recombinant GM-CSF (Catalog #78015) were added on days 1, 3, and 6 to differentiate monocytes into DCs. Cells were either left unstimulated (control) or stimulated with LPS and Human Recombinant IFN-γ (Catalog #78020) (activated). Activation led to secretion of (A) IL-12 (p70) and (B) IL-23, which were not detectable in unstimulated controls, as measured using the Human IL-12 (p70) ELISA Kit (Catalog #02014) and the Human IL-23 ELISA Kit (Catalog #02016), respectively.

*Cytokine concentration of control in culture was lower than the limit of detection.

Wallchart

Frequencies of Human Cell Types in Blood-Related Sources

www.stemcell.com/wallchart-human-cellfrequency

B Cells

B cells express cell surface immunoglobulin receptors that recognize specific antigenic epitopes, and are an integral component in the humoral response of the adaptive immune system. B cells mediate many processes necessary for immune homeostasis, including antibody production, antigen presentation, cytokine secretion, T cell co-stimulation, and tumor immunity. Conversely, their dysregulation is the basis of several immune pathologies, including autoimmunity, leukemia/lymphoma, and multiple myeloma.

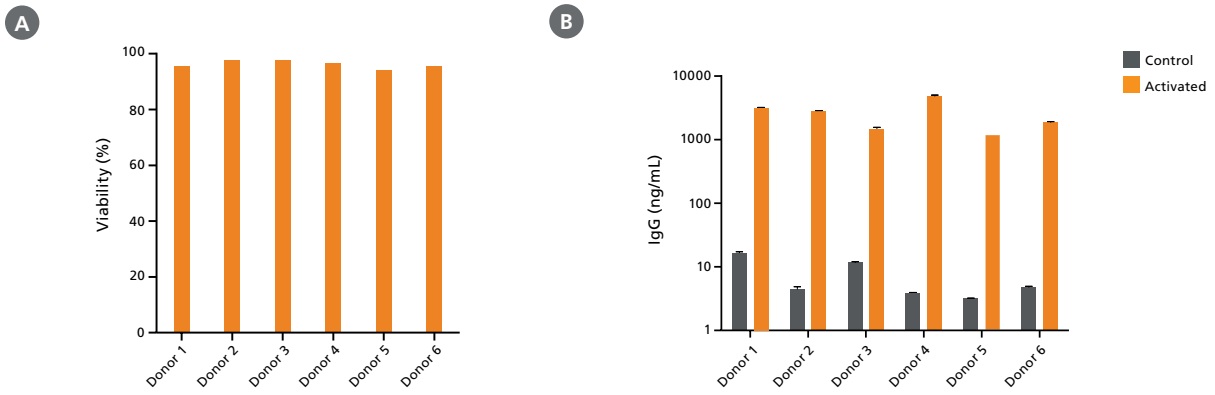


Figure 11. Cryopreserved B Cells Show High Viability and Produce IgG Antibodies Upon Stimulation

(A) B Cells (Catalog #70023) cryopreserved in CryoStor® CS10 (Catalog #07930) show high viability upon thawing (average = 96.3 ± 0.6%, n = 6). (B) B cells were cultured for 1 week in RPMI 1640 Medium (Catalog #36750) with 10% FBS, 2 mM L-Glutamine (Catalog #07100), 10 mM HEPES (Catalog #07200), and 55 µM β-mercaptoethanol and either left unstimulated (control) or stimulated with CD40 in the presence of IL-21 (activated). Activated B cells produce significantly more IgG antibodies compared to unstimulated controls, as measured by ELISA.

Other Subsets

Our portfolio is continually expanding with many newly launched immune cell subsets and now also includes macrophages, neutrophils, and eosinophils. For a complete listing of peripheral blood-sourced immune cells, please visit: www.stemcell.com/pb-immuncells.

Video

Large-Volume Cell Isolation from Whole Blood and Leukopaks

www.stemcell.com/large-volume-cell-isolation

Products

Activation, Expansion, Maintenance, and Differentiation of Immune Cells

www.ImmunoCult.com

Product Listing: Peripheral Blood[1,2]

Leukopaks[3,4]

Description	Anticoagulant	Quantity	Catalog #
Fresh Peripheral Blood Leukopak	ACDA[5]	Tenth Size	200-0092
		Quarter Size	70500.2
		Half Size	70500.1
		Full Size	70500
Frozen Peripheral Blood Leukopak	ACDA[5]	Tenth Size	200-0470
		Quarter Size	200-0132
		Half Size	200-0131
		Full Size	200-0130

LRS Cone[3]

Description	Anticoagulant	Quantity	Catalog #
Leukocyte Reduction System (LRS) Cone	ACDA[5]	1 cone	200-0093

Fresh Human Peripheral Blood Products[3]

Description	Anticoagulant	Quantity	Catalog #
Whole Peripheral Blood[6]	ACDA[5]	1 x 10 mL	70504.1
		2 x 10 mL	70504.2
		3 x 10 mL	70504.3
		4 x 10 mL	70504.4
		5 x 10 mL	70504.5
		10 x 10 mL	70504.6
		≥ 450 mL	70504
Plasma	ACDA[5]	10 mL	200-0150
		20 mL	200-0151
		30 mL	200-0152
		40 mL	200-0153
		50 mL	200-0154
		100 mL	200-0155
		150 mL	200-0156
Serum	-	1 mL	200-0157
		5 mL	200-0158
		10 mL	200-0159

Description	Cell Type	Quantity	Catalog #
Fresh Purified Cells	Peripheral Blood Mononuclear Cells	100 million cells	200-0077
		300 million cells	200-0078
	Pan-T Cells	10 million cells	200-0046
		25 million cells	200-0047
		40 million cells	200-0048
	B Cells	5 million cells	200-0059
		10 million cells	200-0060
	NK Cells	5 million cells	200-0063
		10 million cells	200-0064
	Monocytes	5 million cells	200-0067
		10 million cells	200-0068

1. *Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support (techsupport@stemcell.com) for further information.*
2. *High-resolution HLA typing and CMV status are available upon request.*
3. *Certain fresh products are currently available in the United States, Canada (excluding Quebec), the United Kingdom, and parts of Europe.*
4. *A full-size leukopak typically contains 1.1 ± 0.3 x 10^{10} cells and has a volume of approximately 120 mL.*
5. *ACDA - Acid Citrate Dextrose Solution A.*
6. *Whole peripheral blood is also available with the anticoagulants ethylenediaminetetraacetic acid (EDTA) and sodium heparin (Na heparin).*

For a complete listing of primary cell products, including mobilized peripheral blood products and cultured cells, please visit **www.stemcell.com/primarycells**.

Cryopreserved Human Peripheral Blood Cells[1]

Description	Quantity	Catalog #
Peripheral Blood Mononuclear Cells[2]	15 million cells	70025.1
	25 million cells	70025.2
	50 million cells	70025.3
	100 million cells	70025
Pan-T Cells	20 million cells	70024
	40 million cells	70024.1
CD8+ Memory T Cells	5 million cells	200-0168
Naïve Pan T Cells	5 million cells	200-0170
Th17 Cells	2 million cells	200-0169
CD4+ T Cells	5 million cells	200-0165
	15 million cells	70026
CD4+CD25- T cells	1 million cells	200-0124
	2 million cells	200-0125
CD4+CD25+CD127^{low} T cells	1 million cells	200-0122
	2 million cells	200-0123
CD4+CD25+CD127^{low}FOXP3+ T cells (Tregs)	1 million cells	200-0120
	2 million cells	200-0121
CD4+CD45RA+ T Cells	5 million cells	70029
CD4+CD45RO+ T Cells	5 million cells	70031
CD8+ T Cells	5 million cells	200-0164
	10 million cells	70027
CD8+CD45RA+ T Cells	5 million cells	70030

Description	Quantity	Catalog #
B Cells	10 million cells	70023
	20 million cells	70023.1
CD19+CD27- Naïve B Cells	1 million cells	70032
CD19+ B Cells	10 million cells	70033
Monocytes	10 million cells	70034
	20 million cells	200-0166
	40 million cells	200-0167
CD14+ Monocytes	10 million cells	70035.1
	20 million cells	70035.2
	40 million cells	70035
NK Cells	5 million cells	70036
CD56+ Cells[4]	5 million cells	70037
Macrophages	1.5 million cells	70042
Plasmacytoid Dendritic Cells	0.5 million cells	70046
Pan Dendritic Cells	5 million cells	200-0560
Gamma Delta T Cells	2 million cells	200-0730
Neutrophils	10 million cells	200-0384
Eosinophils	1 million cells	200-0385
PB-Derived Immature Dendritic Cells[3a,5]	1.5 million cells	200-0370
PB-Derived Mature Dendritic Cells[3a]	1.5 million cells	200-0371
PB-Derived M0 Macrophages[3b]	1.5 million cells	200-0372
PB-Derived M1 Macrophages[3b]	1.5 million cells	200-0373
PB-Derived M2a Macrophages[3b]	1.5 million cells	200-0374

Cryopreserved Human Peripheral Blood Products[1]

Description	Quantity	Catalog #
Plasma	10 mL	70039.1
	20 mL	70039.2
	30 mL	70039.3
	40 mL	70039.4
	50 mL	70039.5
	100 mL	70039
	150 mL	70039.6
Serum	1 mL	200-0160
	5 mL	200-0161
	10 mL	200-0162

Cryopreserved Human Platelet Lysate

Description	Quantity	Catalog #
Human Platelet Lysate	50 mL	06960
	100 mL	06961
	500 mL	06962
Human Platelet Lysate, Fibrinogen-Depleted	50 mL	06963
	100 mL	06964
	500 mL	06965
Human Platelet Lysate, Fibrinogen-Depleted, XF	50 mL	200-0360
	100 mL	200-0361
	500 mL	200-0362
Human Platelet Lysate, Fibrinogen-Depleted, GMP-Compliant	50 mL	200-0322
	100 mL	200-0323
	500 mL	200-0324
Human Platelet Lysate, Pathogen-Reduced, GMP-Compliant	50 mL	200-0720
	500 mL	200-0721

Autoimmune and Inflammatory Diseased Human Blood Products[1,2,6,7]

Description	Quantity	Catalog #
Amyotrophic Lateral Sclerosis (ALS)	10 million cells	200-0827
	50 million cells	200-0801
	Plasma	200-0842
Ankylosing Spondylitis	10 million cells	200-0828
	50 million cells	200-0802
	Half leukopak	200-0765
	Full leukopak	200-0756
	Plasma	200-0843
Autoimmune Hepatitis	10 million cells	200-0829
	50 million cells	200-0804
	Plasma	200-0845
Celiac Disease	10 million cells	70058
	50 million cells	200-0805
	Half leukopak	200-0763
	Full leukopak	200-0754
	Plasma	200-0846
COPD	10 million cells	70053
	50 million cells	200-0806
	Plasma	200-0847
Crohn's Disease	10 million cells	70052
	50 million cells	200-0807
	Half leukopak	200-0766
	Full leukopak	200-0757
	Plasma	200-0848
Diabetes, Type I	10 million cells	70061
	50 million cells	200-0808
	Half leukopak	200-0760
	Full leukopak	200-0751
	Plasma	200-0849
Diabetes, Type II	10 million cells	70062
	50 million cells	200-0809
	Half leukopak	200-0761
	Full leukopak	200-0752
	Plasma	200-0850
Graves' Disease	10 million cells	200-0830
	50 million cells	200-0810
	Plasma	200-0851
Hashimoto's Disease	10 million cells	200-0831
	50 million cells	200-0811
	Plasma	200-0852
Hidradenitis Suppurativa	10 million cells	200-0827
	50 million cells	200-0801
	Plasma	200-0842
Inflammatory Myopathy	10 million cells	200-0832
	50 million cells	200-0812
	Plasma	200-0853
Irritable Bowel Syndrome	10 million cells	200-0834
	50 million cells	200-0814
	Plasma	200-0855
Lupus	10 million cells	70054
	50 million cells	200-0815
	Half leukopak	200-0767
	Full leukopak	200-0758
	Plasma	200-0856
Multiple Sclerosis	10 million cells	200-0835
	50 million cells	200-0816
	Plasma	200-0857
Myasthenia Gravis	10 million cells	200-0836
	50 million cells	200-0817
	Plasma	200-0858
Osteoarthritis	10 million cells	70055
	50 million cells	200-0818
	Half leukopak	200-0759
	Full leukopak	200-0750
	Plasma	200-0859
Psoriasis	10 million cells	70055
	50 million cells	200-0818
	Half leukopak	200-0759
	Full leukopak	200-0750
	Plasma	200-0859
Rheumatoid Arthritis	10 million cells	70050
	50 million cells	200-0820
	Half leukopak	200-0764
	Full leukopak	200-0755
	Plasma	200-0861
Scleroderma	10 million cells	200-0837
	50 million cells	200-0821
	Plasma	200-0862
Sjogren's Syndrome	10 million cells	200-0838
	50 million cells	200-0822
	Plasma	200-0863
Type 1 Interferonopathy	10 million cells	200-0839
	50 million cells	200-0823
	Plasma	200-0864
Ulcerative Colitis	10 million cells	70051
	50 million cells	200-0824
	Plasma	200-0865
Vasculitis	10 million cells	200-0840
	50 million cells	200-0825
	Plasma	200-0866

1. *Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support (techsupport@stemcell.com) for further information.*
2. *Additional documentation and high-resolution HLA typing (Class I and Class II alleles) may be available upon request. For diseased cell products, donor disease and treatment information may be available upon request.*
3. *a) ACF-cultured; b) SF-Cultured.*
4. *CD56 antigen is expressed primarily on natural killer (NK) cells, as well as NKT cells in peripheral blood.*
5. *PB = peripheral blood.*
6. *ACDA - Acid Citrate Dextrose Solution A is used as the anticoagulant.*
7. *Diseased states indicate PBMCs obtained from donors diagnosed with a given condition. Additional product options, including fresh or frozen leukopaks and other custom sizes, can also be requested.*

Custom Product Options

Autoimmune and Inflammatory Diseased Cells

www.stemcell.com/forms/diseased-human-peripheral-blood-products-custom-requests.html

Solid Tumor Cancer Diseased-State Human Blood Products[1,5]

Description	Format	Quantity	Catalog #
Solid Tumor Cancer	Leukopak, Fresh	1 billion cells	200-0402
	Whole Peripheral Blood, Fresh [3c,d]	Collection	200-0401 200-0400
	Custom, Frozen[4]	-	200-0403
Liver Cancer	Leukopak, Fresh	1 billion cells	200-0299
	PBMCs[2], Frozen	5-19 million cells	200-0443
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0284 200-0269
	Custom, Frozen[4]	-	200-0237
Lung Cancer	Leukopak, Fresh	1 billion cells	200-0300
	PBMCs[2], Frozen	5-19 million cells	200-0444
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0285 200-0270
	Custom, Frozen[4]	-	200-0238
Breast Cancer	Leukopak, Fresh	1 billion cells	200-0291
	PBMCs[2], Frozen	5-19 million cells	200-0435
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0276 200-0261
	Custom, Frozen[4]	-	200-0229
Cervical Cancer	Leukopak, Fresh	1 billion cells	200-0292
	PBMCs[2], Frozen	5-19 million cells	200-0436
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0277 200-0262
	Custom, Frozen[4]	-	200-0230
Melanoma	Leukopak, Fresh	1 billion cells	200-0301
	PBMCs[2], Frozen	5-19 million cells	200-0445
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0286 200-0271
	Custom, Frozen[4]	-	200-0239
Ovarian Cancer	Leukopak, Fresh	1 billion cells	200-0302
	PBMCs[2], Frozen	5-19 million cells	200-0446
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0287 200-0272
	Custom, Frozen[4]	-	200-0240
Bladder Cancer	Plasma[2], Frozen	1 billion cells	200-0290
	PBMCs[2], Frozen	5-19 million cells	200-0434
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0275 200-0260
	Custom, Frozen[4]	-	200-0228

Description	Format	Quantity	Catalog #
Prostate Cancer	Leukopak, Fresh	1 billion cells	200-0304
	PBMCs[2], Frozen	5-19 million cells	200-0448
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0289 200-0274
	Custom, Frozen[4]	-	200-0242
Esophageal Cancer	Leukopak, Fresh	1 billion cells	200-0295
	PBMCs[2], Frozen	5-19 million cells	200-0439
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0280 200-0265
	Custom, Frozen[4]	-	200-0233
Colorectal Cancer	Leukopak, Fresh	1 billion cells	200-0293
	PBMCs[2], Frozen	5-19 million cells	200-0437
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0278 200-0263
	Custom, Frozen[4]	-	200-0231
Head and Neck Cancer	Leukopak, Fresh	1 billion cells	200-0297
	PBMCs[2], Frozen	5-19 million cells	200-0441
	Whole Peripheral Blood, Fresh[5c,d]	Collection	200-0282 200-0267
	Custom, Frozen[4]	-	200-0235
Gastric Cancer	Leukopak, Fresh	1 billion cells	200-0296
	PBMCs[2], Frozen	5-19 million cells	200-0440
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0281 200-0266
	Custom, Frozen[4]	-	200-0234
Kidney Cancer	Leukopak, Fresh	1 billion cells	200-0298
	PBMCs[2], Frozen	5-19 million cells	200-0442
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0283 200-0268
	Custom, Frozen[4]	-	200-0236
Pancreatic Cancer	Leukopak, Fresh	1 billion cells	200-0303
	PBMCs[2], Frozen	5-19 million cells	200-0447
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0288 200-0273
	Custom, Frozen[4]	-	200-0241
Endometrial Cancer	Leukopak, Fresh	1 billion cells	200-0294
	PBMCs[2], Frozen	5-19 million cells	200-0438
	Whole Peripheral Blood, Fresh[3c,d]	Collection	200-0279 200-0264
	Custom, Frozen[4]	-	200-0232

1. *Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support (techsupport@stemcell.com) for further information.*
2. *High-resolution HLA typing and CMV status are available upon request.*
3. *a) ACDA - Acid Citrate Dextrose Solution A; b) CP2D - Citrate-Phosphate-Double Dextrose; c) EDTA - Ethylenediaminetetraacetic Acid; d) Na Heparin - Sodium Heparin.*
4. *Custom frozen human primary biological materials include plasma and serum from donors diagnosed with the specific cancer.*
5. *Diseased states indicate PBMCs obtained from donors diagnosed with a given condition.*

Hematological Cancer Diseased-State PBMCs[1,2]

Description	Quantity	Catalog #
Acute Myeloid Leukemia (AML)	Custom	200-0244
	5-19 million cells	200-0450
Acute Lymphoblastic Leukemia (ALL)	Custom	200-0243
	5-19 million cells	200-0449
Myelofibrosis (MF)	Custom	200-0251
	5-19 million cells	200-0457
Diffuse Large B Cell Lymphoma (DLBCL)	Custom	200-0247
	5-19 million cells	200-0453
Mantle Cell Lymphoma (MCL)	Custom	200-0249
	5-19 million cells	200-0455
Follicular Lymphoma (FL)	Custom	200-0248
	5-19 million cells	200-0454
Multiple Myeloma (MM)	Custom	200-0250
	5-19 million cells	200-0456
Chronic Myelogenous Leukemia (CML)	Custom	200-0246
	5-19 million cells	200-0452
Chronic Lymphocytic Leukemia (CLL)	Custom	200-0245
	5-19 million cells	200-0451

1. *Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support (techsupport@stemcell.com) for further information.*
2. *Diseased states indicate PBMCs obtained from donors diagnosed with a given condition.*

Mobilized Peripheral Blood Cells

Mobilized peripheral blood can be used to obtain large numbers of hematopoietic stem and progenitor cells (HSPCs) from a single collection, ensuring consistency across multiple experiments or large-scale studies. Mobilization with granulocyte colony-stimulating factor (G-CSF), Plerixafor (Mozobil®), or a combination of both G-CSF and Plerixafor, induces HSPCs to migrate out of the bone marrow and into the peripheral blood.

Normal adult donors are mobilized with G-CSF for 3 - 5 days prior to collection of G-CSF-mobilized cells. Alternatively, donors are mobilized with Plerixafor for 1 day prior to collection of Plerixafor-mobilized cells. Cells are collected using the Spectra Optia® Apheresis system with ACDA as the anticoagulant. High-resolution HLA typing is available upon request.

Mononuclear Cells

Mononuclear cells (MNCs) are isolated using density gradient centrifugation or red blood cell lysis and cryopreserved in CryoStor® CS10. Over 300 vials of 1 x 10^9 MNCs can be produced and cryopreserved from a single leukopak, ensuring consistency across multiple experiments.

Hematopoietic Stem and Progenitor Cells

CD34+ cells are isolated using immunomagnetic positive selection and cryopreserved in serum-free cryopreservation medium containing 10% DMSO. Typical lot sizes of 100 - 200 vials of 1 x 10^6 CD34+ cells are cryopreserved from a single leukopak, ideal for large-scale studies.

Mobilized Leukopaks

Choose from donors mobilized with either granulocyte colony-stimulating factor (G-CSF), plerixafor, or a combination of both G-CSF and plerixafor. The cytokine G-CSF or filgastim (Neupogen®) is the most commonly used mobilizing agent and is used as a gold standard in the clinic. The bicyclam plerixafor (Mozobil®) is a rapid-acting mobilization agent. The combination of both mobilization agents works synergistically, increasing the CD34+ mobilization compared to single-agent mobilization.

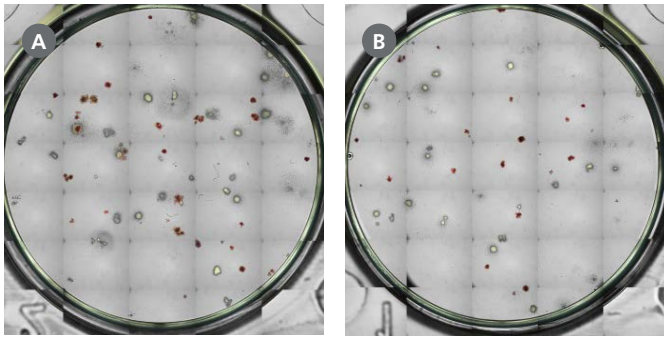


Figure 12. Cryopreserved Mobilized Peripheral Blood Mononuclear Cells and $CD34^+$ Cells Generate Hematopoietic Colonies in CFU Assays

(A) Cryopreserved mobilized peripheral blood mononuclear cells (Catalog #70049) or (B) CD34+ cells (Catalog #70060) were thawed and plated at a concentration of 1 x 10^4 or 5 x 10^2 viable cells/dish, respectively. Cells were cultured in MethoCult™ Optimum Medium (Catalog #04034) for 14 days to allow colony formation by individual progenitors. Colonies produced by hematopoietic progenitor cells within each sample were imaged and quantified with STEMvision™.

On-Demand Training

CFU Assay Course

www.stemcell.com/hematopoietic-on-demand-training

Mobilizing Agent	Mobilizing Regimen	Mobilization and Collection Schedule						Quantity	Apheresis	Catalog #
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6			
Granulocyte Colony-Stimulating Factor (G-CSF)	5-Day					First Collection	Second Collection	1 Bag	First Collection (Day 5)	200-0602
									Second Collection (Day 6)	200-0603
								2 Bags	Both Collections (Day 5 and 6)	100-1101 (200-0602 & 200-0603)
Plerixafor	1-Day	First Collection						1 Bag	First Collection	200-0604
G-CSF + Plerixafor (Combo)	5-Day					First Collection	Second Collection	1 Bag	First Collection (Day 5)	200-0607
									Second Collection (Day 6)	200-0608
								2 Bags	Both Collections (Day 5 and 6)	100-1103 (200-0607 & 200-0608)

G-CSF (NEUPOGEN®): a maximum of 10 µg/kg/day

Plerixafor (Mozobil®): a maximum of 0.24 mg/kg/day

One leukopak bag collected on the specified day of the collection schedule

Figure 13. Mobilized Leukopak Selection Guide

Normal donors are mobilized with specified doses of G-CSF, plerixafor, or both mobilizing agents, based on the regimen shown above, prior to collection. The time interval between injection and apheresis can be found listed in the Certificate of Analysis.

Table 1. CD34+ Cell Sources, Frequencies (%), and Features

Description	Mobilized Peripheral Blood (mPB)	Cord Blood (CB)	Bone Marrow (BM)
Frequency of CD34+ Cells (%)[1,2]	1.1 ± 0.9%	0.1 - 1%[3]	1.7 ± 0.5%[4]
Features	• Higher frequency of CD34+ cells compared to the other two sources • More representative than CB of the cell source used for HSC transplantation or gene therapy • Less invasive procedure for collection when compared to BM	• More readily available for research, such as for basic HSC biology and proof-of-principle studies for cellular therapy development • Limited donor volumes, meaning low cell numbers and variable quality of individual CBs • Greater capacity for cell division than other CD34+ cell sources; ~85x increase in cell numbers over 10-day expansion • Higher cloning efficiencies and proliferative capacity in comparison to adult sources, such as BM	• Larger initial sample sizes than CB • Donors are recallable • Additional cell types can be isolated, including mesenchymal stromal cells (MSCs) and mononuclear cells • Limited number of CD34+ cells and lower proliferative potential for genetic manipulation

1. *Data sourced from STEMCELL Technologies.*
2. *These frequencies are expected when using fresh samples that are less than 48 hours old. After 48 hours, the cell frequency is expected to decline.*
3. *Sourced from: https://www.stemcell.com/technical-resources/cord-blood-cd34-cell-isolation.html.*
4. *Washed BM.*

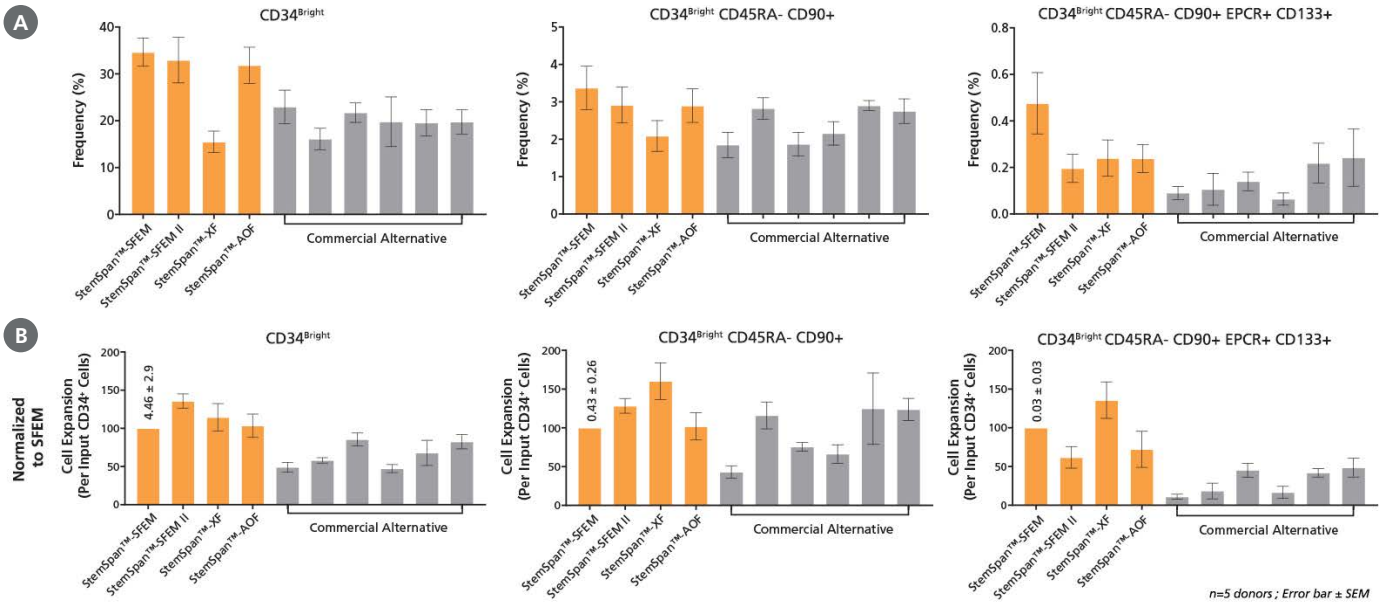


Figure 14. StemSpan™ Media Support Equal or Greater Expansion of Mobilized Peripheral Blood HSPCs Compared to Other Commercial Media

Purified CD34+ cells derived from G-CSF mobilized peripheral blood (mPB) were cultured at a concentration of 10,000 cells per mL in StemSpan™ media (SFEM, SFEM II, AOF, and XF; orange bars), and in six media from other suppliers (Commercial Alternatives; gray bars). All media were supplemented with StemSpan™ CD34+ Expansion Supplement and UM729 (1 µM). After 7 days of culture, the (A) frequency and (B) cell expansion of viable $CD34^{bright}$, $CD34^{bright}$CD45RA-CD90+, and $CD34^{bright}$CD45RA-CD90+CD133+EPCR+ cells were analyzed by flow cytometry. Fold expansion was normalized to StemSpan™ SFEM (number above the bar indicates average yield per input CD34+ cell ± SEM). Compared to the competitor media tested, StemSpan™ media supported similar or higher expansion of $CD34^{bright}$, $CD34^{bright}$CD45RA-CD90+, and $CD34^{bright}$CD45RA-CD90+CD133+EPCR+ cells (each subsequent cell subset being progressively more enriched for functional stem/progenitor cells). Data shown are mean ± SEM (n = 5).

Product Listing: Mobilized Peripheral Blood

Cryopreserved Mobilized Peripheral Blood Cells[1]

Description	Quantity	Catalog #
G-CSF Mobilized Mononuclear Cells	5 million cells	70049.4
	15 million cells	70049.2
	25 million cells	70049.3
	50 million cells	70049.1
	100 million cells	70049
G-CSF Mobilized CD34+ Cells	0.2 million cells	70060.2
	1 million cells	70060.1
	5 million cells	70060
	10 million cells	70060.3
	20 million cells	70060.4
G-CSF and Plerixafor Mobilized Mononuclear Cells	5 million cells	70072.4
	15 million cells	70072.2
	25 million cells	70072.3
	50 million cells	70072.1
	100 million cells	70072
G-CSF and Plerixafor Mobilized CD34+ Cells	0.2 million cells	70073.2
	1 million cells	70073.1
	5 million cells	70073
	10 million cells	70073.3
	20 million cells	70073.4
Plerixafor Mobilized Mononuclear Cells	5 million cells	70074.4
	15 million cells	70074.2
	25 million cells	70074.3
	50 million cells	70074.1
	100 million cells	70074
Plerixafor Mobilized CD34+ Cells	0.2 million cells	70075.2
	1 million cells	70075.1
	5 million cells	70075
	10 million cells	70075.3
	20 million cells	70075.4

Mobilized Leukopaks

Description	Anticoagulant	Quantity	Apheresis	Catalog #
Fresh Human Mobilized Peripheral Blood Leukopak, G-CSF	ACDA[2]	1 bag	First Collection (Day 5)	200-0602
			Second Collection (Day 6)	200-0603
		2 bags	Both Collections (Day 5 and 6)	100-1101 (200-0602 & 200-0603)
Fresh Human Mobilized Peripheral Blood Leukopak, Plerixafor	ACDA[2]	1 bag	First Collection	200-0604
Fresh Human Mobilized Peripheral Blood Leukopak, G-CSF and Plerixafor	ACDA[2]	1 bag	First Collection (Day 5)	200-0607
			Second Collection (Day 6)	200-0608
		2 bags	Both Collections (Day 5 and 6)	100-1103 (200-0607 & 200-0608)

1. *Certain cryopreserved products are only available in select territories. Please contact Product and Scientific Support (techsupport@stemcell.com) for further information.*
2. *ACDA - Acid Citrate Dextrose Solution A.*

Cord Blood Cells

Cord blood is a rich source of hematopoietic stem and progenitor cells (HSPCs) and is collected using citrate-phosphate-dextrose (CPD) as the anticoagulant. Large numbers of mononuclear cells (MNCs), HSPCs, immune cells, and blood plasma are isolated from umbilical cords. High-resolution HLA typing is available upon request.

Mononuclear Cells

MNCs are obtained by density gradient centrifugation of whole cord blood. Specific cell types are subsequently purified using STEMCELL's cell isolation reagents. Cryopreserved MNCs can be used in a variety of downstream applications, including enumeration of multipotentent and lineage-committed hematopoietic progenitor cells (HPCs) in the colony-forming unit (CFU) assay with MethoCult™ methylcellulose-based medium, or expansion and/or differentiation with StemSpan™ media and supplements (Figure 15).

Plasma

Frozen human plasma is isolated using centrifugation from umbilical cord blood (CB) collected using citrate-phosphate-dextrose (CPD) as an anticoagulant. Plasma contains a variety of cytokines, chemokines, and growth factors required for cell maintenance during hematopoiesis, and can be applied in a wide variety of therapeutic uses.

Hematopoietic Stem and Progenitor Cells

HSPCs are a heterogeneous population of cells that include multipotent stem cells as well as lineage-committed progenitor cells of all mature blood cells. HSPCs are characterized in part by the expression of the cell surface protein CD34. Cord blood CD34+ cells are isolated from MNCs and cryopreserved using StemSpan™ Serum-Free Expansion Medium (SFEM) (Catalog #09650) with 10% DMSO. Choose cord blood CD34+ cells (Catalog #70008) derived from a single cord blood unit or access large lots of cord blood CD34+ cells derived from multiple cord blood units.

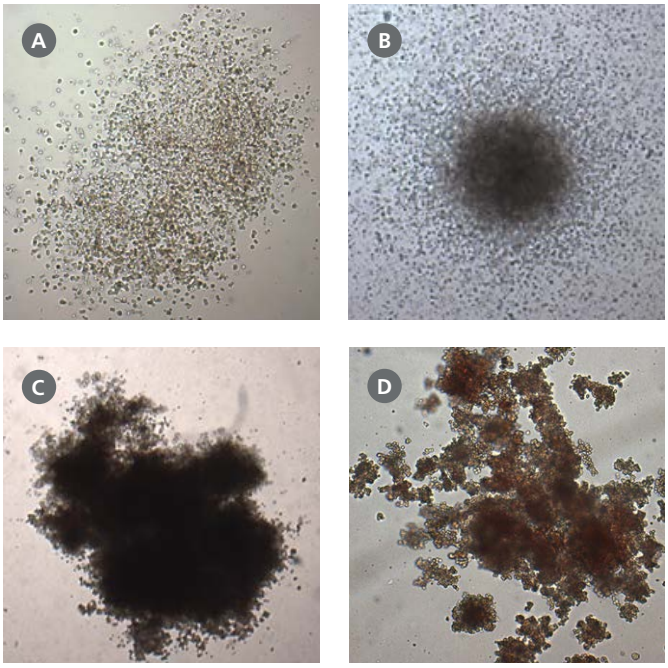


Figure 15. Cryopreserved Cord Blood MNCs Generate Hematopoietic Colonies in CFU Assays

Cord blood MNCs (Catalog #70007) were cultured in MethoCult™ H4034 Optimum Medium (Catalog #04034) for 14 days. Hematopoietic progenitor cells within the MNC population generated multiple colonies derived from (A,B) colony-forming unit—granulocyte/macrophage (CFU-GM) and (C,D) burst-forming unit—erythroid (BFU-E). Colonies shown here were imaged on Day 14 using an inverted microscope with 4x objective.

For a complete listing of cord blood primary cell products, see page 22 or please visit www.stemcell.com/products/product-types/primary-and-cultured-cells.html.

Bone Marrow Cells

A wide range of cell types, including hematopoietic and mesenchymal cells, can be isolated from bone marrow. Bone marrow is collected from adult donors using heparin as the anticoagulant. Bone marrow donors may be available for subsequent collections, ensuring consistency across multiple experiments.

Large numbers of cryopreserved mononuclear cells (MNCs) and hematopoietic stem and progenitor cells (HSPCs) are isolated from full bone marrow collections of approximately 100 mL. High-resolution HLA typing is available upon request.

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 16).

Figure 16. Fresh Whole Bone Marrow

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

Mononuclear Cells

Bone marrow MNCs are obtained by density gradient centrifugation of 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 17).

Hematopoietic Stem and Progenitor Cells

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

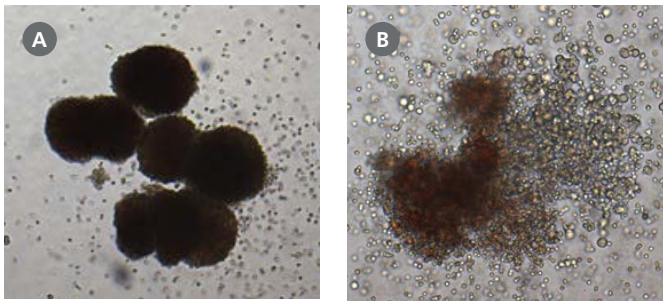


Figure 17. Cryopreserved Bone Marrow MNCs Generate Hematopoietic Colonies in CFU Assays

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 units—granulocyte, erythroid, macrophage, megakaryocyte (CFUGEMM). Colonies shown here were imaged on Day 14 with (A) 4x objective and (B) 10x objective, respectively.

For a complete listing of bone marrow primary cell products, see page 22 or please visit www.stemcell.com/products/product-types/primary-and-cultured-cells.html.

Mesenchymal Stromal Cells

Mesenchymal stromal cells (MSCs), also termed bone marrow stromal cells, 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. 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 x 10^5 cells per vial are available per lot, making it possible to hold 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.

Webinar

Tools to Accelerate Your MSC Workflows

www.stemcell.com/msc-workflows-webinar

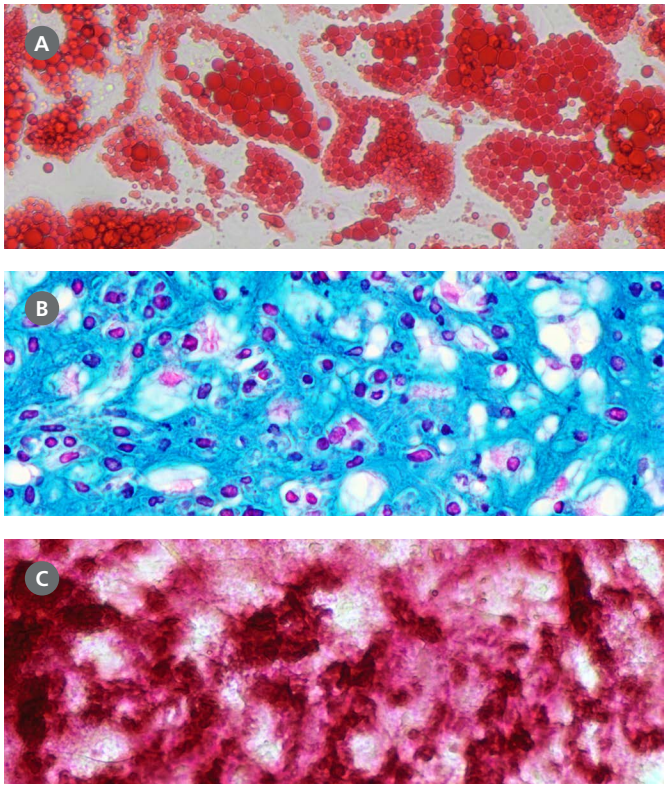


Figure 18. Cryopreserved Bone Marrow Stromal Cells Cultured in MesenCult™-ACF Plus Medium Kit Maintain Robust Multi-Lineage Potential

Human bone marrow stromal cells maintained in the MesenCult™-ACF Plus Culture Kit (Catalog #05448) can be further differentiated using the respective MesenCult™ differentiation kits.

Representative microscopy image of (A) Oil Red O stained adipocytes generated with the MesenCult™ Adipogenic Differentiation Kit (Catalog #05412), (B) Alcian Blue and Nuclear Fast Red stained chondrocytes generated with the MesenCult™-ACF Chondrogenic Differentiation Kit (Catalog #05455), and (C) Alizarin Red S stained osteoblasts generated with the MesenCult™ Osteogenic Differentiation Kit (Catalog #05465).

Product Listing: Cord Blood

Cryopreserved Cord Blood Cells

Description	Quantity	Catalog #
Mononuclear Cells	15 million cells	70007.1
	50 million cells	70007.2
	150 million cells	70007
CD34+ Cells (Mixed Donor)	0.2 million cells	70008.1
	0.5 million cells	70008.3
	1 million cells	70008
CD34+ Cells (Single Donor)	0.2 million cells	70008.2
	0.5 million cells	70008.4
	0.6 million cells	200-0000
	0.7 million cells	200-0001
	0.8 million cells	200-0002
	1 million cells	70008.5
CD19+ B Cells	1 million cells	70013
	2.5 million cells	70013.1
	5 million cells	70013.2
Pan-T Cells	15 million cells	70014
CD4+ T Cells	15 million cells	70015
CD4+CD45RA+ T Cells	15 million cells	70017
CD8+ T Cells	5 million cells	70016
CD14+ Monocytes	5 million cells	70018
CD56+ Cells[1]	1 million cells	70019
Plasma	10 mL	70020.1
	20 mL	70020.2
	30 mL	70020.3
	40 mL	70020.4
	50 mL	70020

1. *CD56 antigen is expressed primarily on natural killer (NK) cells, as well as NKT cells in peripheral blood.*

Product Listing: Bone Marrow

Fresh Whole Bone Marrow

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

Cryopreserved Bone Marrow Cells

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+ 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+ Cells[1]	1 million cells	70003
CD33+ Cells	5 million cells	70006
Stromal Cells Derived in ACF Medium[1]	0.75 million cells	70071

1. *Cultured cell product.*

Primary Cell-Based Assay Services

In addition to the characterization services for primary cells listed on page 4, STEMCELL's Contract Assay Services (CAS) also provide cell-based assay services. These include the CFU assay for toxicity testing as well as the development of custom assays for a variety of cell types. CAS can pre-qualify primary cells for use in specific assays.

Learn more about CAS at www.contractassay.com, or contact contractassay@stemcell.com to discuss your research.

Hematopoietic	Immune	Mesenchymal
Colony-Forming Cell (CFC/CFU) Assay	Custom Immune Services	Phenotypic Characterization
HemaTox™ Assays	Cell Prep (Isolation, Expansion, Differentiation)	Growth Characterization
Xenograft Model (NSG) (In Vivo)	Treatments (Activation, Suppression)	Differentiation Assay
Stem Cell Mobilization (In Vivo)	Endpoints (Flow cytometry, ELISA, MSD, qPCR)	Functional Assay (T Cell Suppression)
CD34+ Stimulation Assay	Macrophage Activation & Polarization	Toxicity Assay (Colony-Forming Unit Fibroblast)

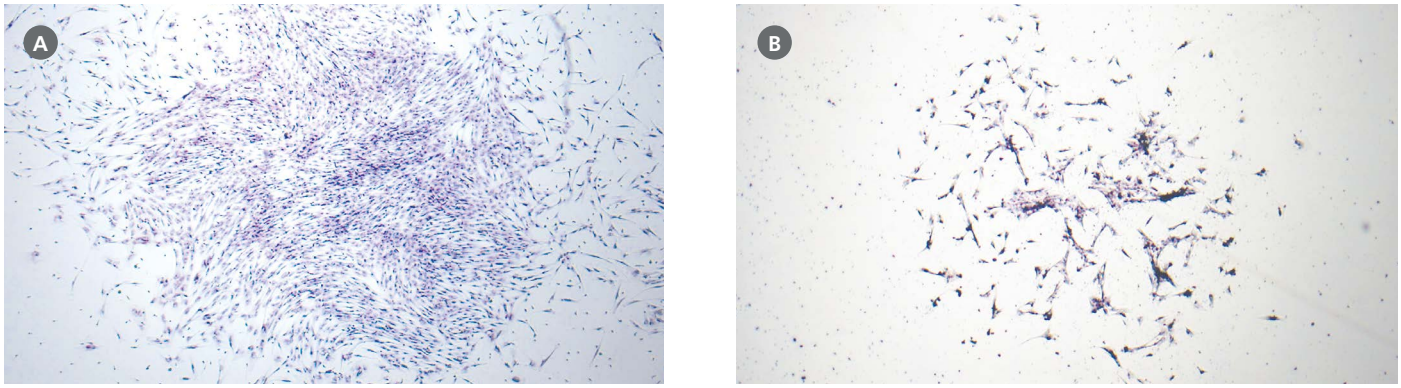


Figure 19. Example CFU-F Assay Data from CAS Showing the Effects of an Inhibitory Compound

Colonies derived from MSCs plated in the (A) absence or (B) presence of an inhibitory compound have notable differences in morphology, including fewer cells and a more scattered distribution in the culture containing the inhibitory compound in colony-forming unit - fibroblast (CFU-F) assays. Colony numbers are also reduced in the presence of an inhibitory compound (data not shown).

Donor Viral Screening Policy

Leukopaks, Whole Blood, Purified Cells, Plasma, Serum, Bone Marrow, and LRS Cones - Fresh Products*

Donors are screened for HIV-1, HIV-2, hepatitis B, and hepatitis C. Donors in the U.K. are also screened for HTLV I/II and syphilis. 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 Certificate of Analysis (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 (with the exception of cancer patient donors) 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, and within 4 - 7 business days in the case of fresh LRS Cones). Cancer patient donors for fresh blood products are screened only once initially, with the test date and result recorded on the CoA.

Mobilized Peripheral Blood Leukopaks - Fresh Products*

For fresh mobilized leukopaks donors are screened for HIV-1, HIV-2, hepatitis B, hepatitis C, HTLV-I/-II, Syphilis, and WNV. 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 most recent viral testing on the Certificate of Analysis (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).

Leukopaks, Whole Blood, Purified Cells, Plasma, Serum, and Bone Marrow - Cryopreserved Products*

Donors are screened for HIV-1, HIV-2, hepatitis B, and hepatitis C (with the exception of cancer patient donors for cryopreserved products). Donors in the U.K. are also screened for HTLV I/II and syphilis. 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 CoA.

Cord Blood Purified Cells and Plasma - Cryopreserved Products*

Testing for HIV-1, HIV-2, hepatitis B, and hepatitis C is performed on a sample of maternal blood and/or donated cord blood. Products with negative test results from the donor screening are shipped with the CoA.

Donor Recall

Donors can be recalled for your experiments; however, some donors are either not eligible for recall or are simply not interested in providing future donations. Please note that recall status can be changed at any time based on donors' preferences. If recallable donors are desired, please specify this to your sales representative before placing an order.

- Minimum timelines for donor recalls are as follows:
- Bone Marrow: eligible 56 days after last donation
- Normal Leukopak: eligible 35 - 56 days after last donation
- Autoimmune/Inflammatory Diseased Leukopak: eligible 90 days after last donation
- Cancer Diseased Leukopak: may not be eligible for recall
- Whole Blood: eligible 35 - 56 days after last donation
- Mobilized Leukopak: the number of mobilizations per donor is dependent on the donor site with guidance from the medical director. Donors may be mobilized two to three times.

Resource

Frequently Asked Questions on Primary Cells
www.stemcell.com/primarycellsfaqs

*Certain products are only available in select territories.

Standardize Your Cell Thawing Process

Cryopreservation and thawing are useful techniques performed by researchers routinely handling cells and tissues. Conventional methods for thawing frozen primary cells can present challenges such as inconsistent cell recovery. By using a standardized cell thawing process, researchers can minimize variability in sample handling and get a consistent thawing performance, which is critical for successful downstream applications.

ThawSTAR® CFT2 Thawing System

Increase confidence in your cell thawing workflow and ensure sample sterility and consistent thawing performance by using the ThawSTAR® CFT2 (Catalog #100-0650) Automated Thawing System. With a standardized thawing process that replaces manual, water bath-based thawing, the ThawSTAR® CFT2 system eliminates the risk of contamination and delivers controlled thawing profiles. Utilize ThawSTAR® CFT2 to easily and consistently thaw cryogenic vials. Simply insert a frozen sample and retrieve it once the device alerts you at the end of the thaw cycle.

Maximise Post-Thaw Recovery with CryoStor® CS10

Cryopreserve a variety of sensitive cell types with ready-to-use, serum-free CryoStor® CS10. cGMP CryoStor® CS10 is a uniquely formulated medium manufactured with USP-grade components, so that you can ensure consistency and control according to quality standards. This medium is protein and animal-component-free, providing a safe and protective environment for the cryopreservation of sample types, including myeloma cell lines, human pluripotent stem cells, blood-derived cells, and more.

Cell Thawing Instruments

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

Freezing Media

Product	Catalog #
CryoStor® CS10 Cell Freezing Medium	07930

Why ThawSTAR® CFT2 Thawing System?

- Obtain reproducible thawing profiles using a standardized thawing method.
- Eliminate risk of contamination from water bath-based thawing techniques.
- Maximize viability and function of cryo-sensitive cells.
- Benefit from a convenient and compact format.

Video

Cryopreserve Human PBMCs With CryoStor® CS10

www.stemcell.com/Cryopreserve-Primary-Cells-With-Cryostor

Figure 20. ThawSTAR® CFT2 Automated Thawing System

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

Simplify Cell Isolation with EasySep™

A Column-Free Immunomagnetic Technology

Easy 250 EasySep™ Magnet

Scale up your manual cell isolations and obtain cells from large-volume samples such as leukopaks and whole blood with the Easy 250 EasySep™ Magnet (Catalog #100-0821). Rather than splitting your cell suspension and performing multiple rounds of isolations, with the Easy 250 EasySep™ Magnet you can process up to 225 mL and 1.25 x 10^{10} cells in a single isolation step and as little as 20 minutes. Use this magnet with a standard T-75 cm^2 cell culture flask and EasySep™ reagents to speed up cell isolation from large-volume samples such as full-size leukopaks and whole blood. The isolated cells are immediately ready for downstream applications.

Obtain purities of up to 99% for human cell types isolated from large sample volumes, including:

- T cells and T cell subsets
- B cells
- Monocytes
- Natural killer cells
- Peripheral blood mononuclear cells
- And more!

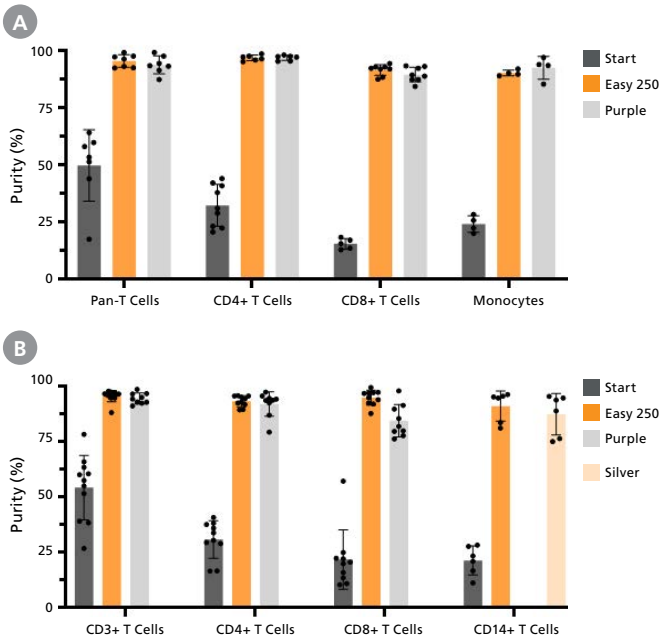


Figure 21. Using the Easy 250 EasySep™ Magnet Results in Highly Purified Cells of Interest

Human immune cells were isolated from processed leukopaks using the corresponding (A) EasySep™ negative selection kits or (B) EasySep™ positive selection kits. Cell purity was measured before isolation (Start) and after isolation with the Easy 250 EasySep™ Magnet (Easy 250), EasySep™ Magnet (Purple), or "The Big Easy" EasySep™ Magnet (Silver). Purity was assessed by staining with cell surface markers for pan-T cells (CD3+), CD4+ T cells (CD3+CD4+), CD8+ T cells (CD3+CD8+), or monocytes (CD14+CD45+), and analyzed by flow cytometry. Data shown as mean ± SD; n = 4 - 12.

Figure 22. Easy 250 EasySep™ Magnet

In as little as 20 minutes, process up to 225 mL of sample and 1.25 x 10^{10} cells, with a single isolation step, using the Easy 250 EasySep™ Magnet.

Product Listing for Cell Isolation from Large-Volume Samples

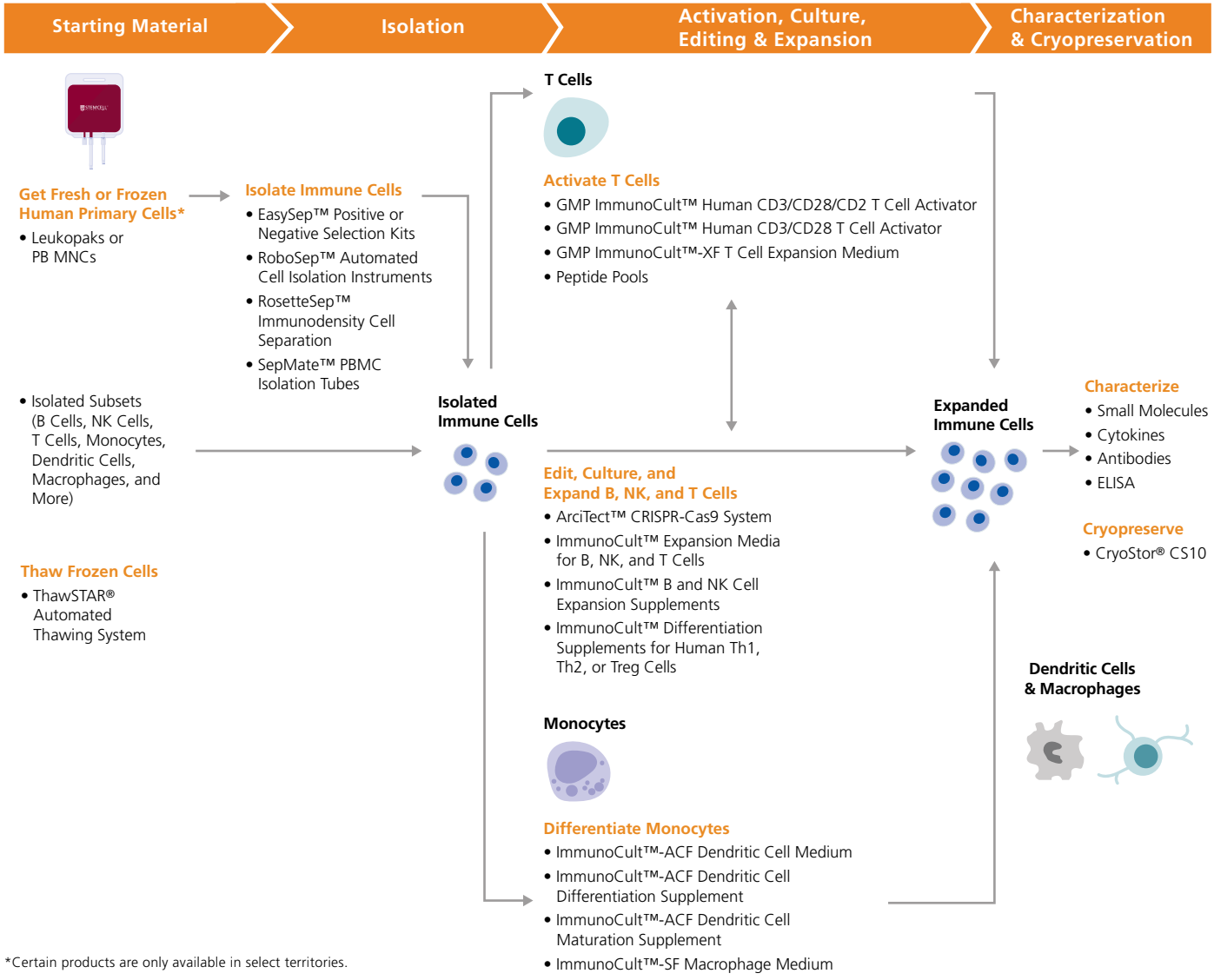
Product	Catalog #
Easy 250 EasySep™ Magnet	100-0821
EasySep™ Human T Cell Isolation Kit	100-0695
EasySep™ Human CD3 Positive Selection Kit II	100-0692
EasySep™ Human CD4+ T Cell Isolation	100-0796
EasySep™ Human CD4 Positive Selection Kit II	100-0693
EasySep™ Human CD8+ T Cell Isolation Kit	100-0710
EasySep™ Human CD8 Positive Selection Kit II	100-0699
EasySep™ Human CD4+CD127lowCD25+ Regulatory T Cell Isolation Kit	100-1136
EasySep™ Human TCR Alpha/Beta Depletion Kit	100-1660
EasySep™ Human Monocyte Isolation Kit	100-0697
EasySep™ Human CD14 Positive Selection Kit II	100-0694
EasySep™ Direct Human PBMC Isolation Kit	19654
EasySep™ RBC Depletion Reagent	18170
EasySep™ Human NK Cell Isolation Kit	100-0960
EasySep™ Human B Cell Isolation Kit	100-0971
EasySep™ Human CD34 Positive Selection Kit II	100-1569

Product

Request a Free Demonstration

www.stemcell.com/forms/demo-easy250.html

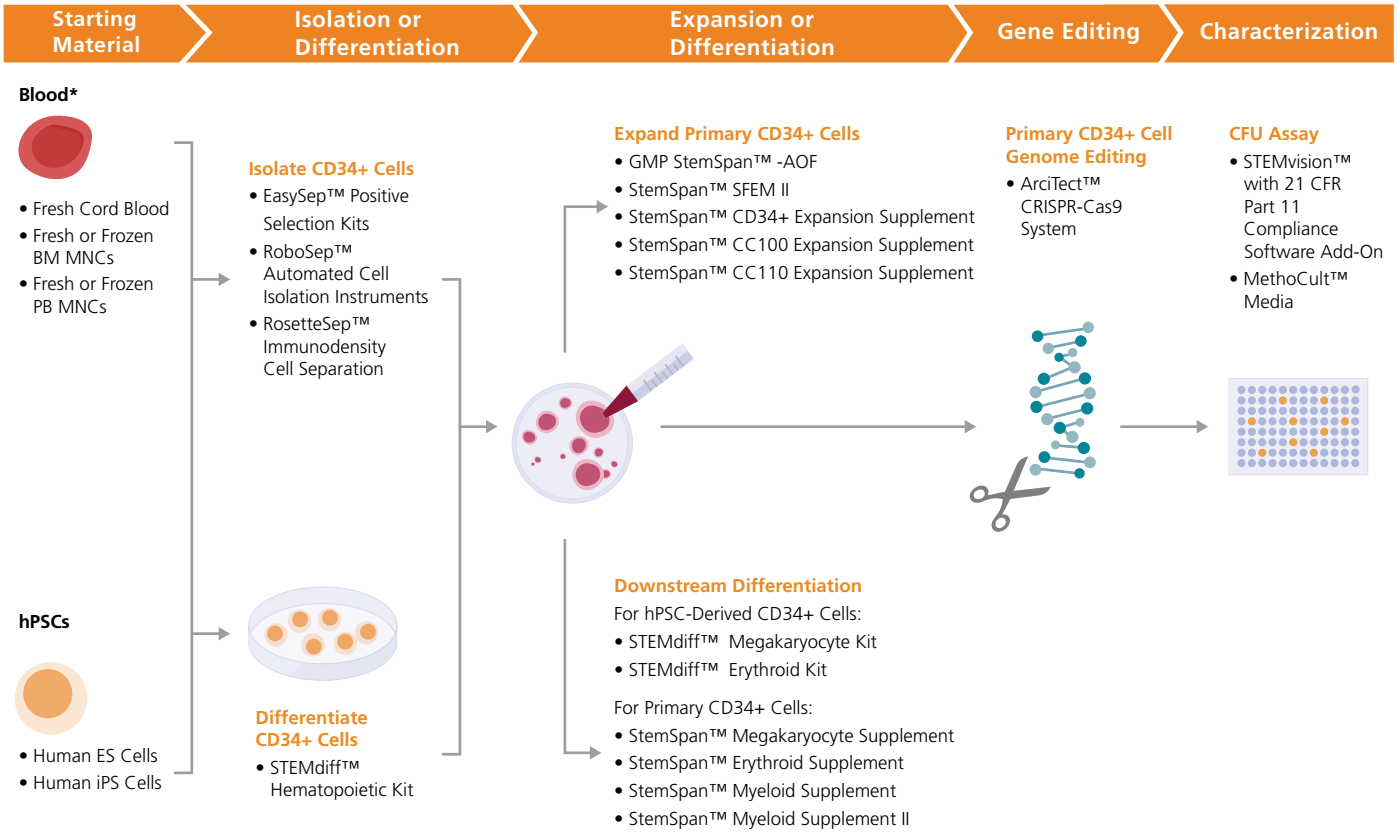
Product Workflow Fit



*Certain products are only available in select territories.

Figure 23. Example of a Complete Product Workflow for Generating High Yields of Immune Cells

Start with a reliable source of fresh or frozen human primary cells, available in various formats to fit your needs. With STEMCELL's efficient cell isolation technologies, you can enrich for the cell subsets you need—at small- or large-scale as required. For optimal cell yield and frequency, use serum-free ImmunoCult™ cell culture media and supplements, which are fully compatible with our cell isolation products, to activate, expand, or differentiate cells to use in your downstream applications. ImmunoCult™ may also be used with the ArciTect™ CRISPR-Cas9 System to gene edit immune cells with high efficiency. Expanded cells can be cryopreserved for future use or characterized with our broad porfolio of cell processing and analysis reagents. PB MNCs: peripheral blood-derived mononuclear cells, NK cells: natural killer cells.



**Certain products are only available in select territories.*

Figure 24. Example of a Complete Product Workflow for Hematopoietic Cell and Gene Therapy Research and Development

Start with a reliable source of HSPCs by using our fresh or frozen human blood products, including MNCs. CD34+ or other cell subsets may be isolated from these samples by using our immunomagnetic EasySep™ cell isolation kits. Alternatively, you may start with our ready-to-use human primary CD34+ cells or differentiate CD34+ cells from hPSCs using the STEMdiff™ Hematopoietic Kit. Human CD34+ cells can be reproducibly expanded or differentiated in serum-free conditions with StemSpan™ media and supplements—such as GMP, animal origin-free StemSpan™-AOF medium—or with lineage-specific STEMdiff™ kits. Primary cell-derived CD34+ cells may be efficiently gene edited using the ArciTect™ CRISPR-Cas9 System. Unmodified and gene-edited CD34+ cells can be cultured in MethoCult™ media and analyzed using the STEMvision™ instrument, which is now available with a software add-on for use in high-compliance environments. BM MNCs: bone marrow-derived mononuclear cells, ES Cells: embryonic stem cells, iPS Cells: induced pluripotent stem cells, hPSCs: human pluripotent stem cells, PB MNCs: peripheral blood-derived mononuclear cells.

Thaw, Isolate, Maintain, Expand, Quantify and Cryopreserve Cells Efficiently

Highly Purified Cells for Any Downstream Application

Ensure that your isolated cells are viable and suitable for downstream functional and biological studies using fast, easy, and column-free cell separation.

ThawSTAR® CFT2

Automated Thawing System for Frozen Human Primary Cells

Increase confidence in your cell thawing workflow, ensure sample sterility, and get consistent thawing performance by using the ThawSTAR® CFT2 Automated Thawing System. For more information, please visit: www.stemcell.com/thawstar.

EasySep™

Simplified Immunomagnetic Cell Isolation

EasySep™ isolates cells easily and efficiently without the use of columns in as little as 8 minutes. With a simple pour, isolated cells are immediately ready for downstream use. For more information, please visit: www.stemcell.com/easysep.

RoboSep™

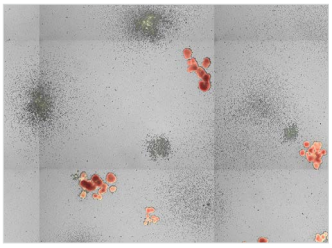
Fully Automated Immunomagnetic Cell Isolation

RoboSep™-S and RoboSep™-16 fully automate all cell labeling and separation steps of the EasySep™ procedure, minimizing sample handling and freeing up technician time. For more information, please visit: www.stemcell.com/robosep.

StemSpan™

Serum-Free Hematopoietic Cell Media and Expansion Supplements

StemSpan™ serum-free hematopoietic cell expansion media promote the expansion of normal or leukemic human hematopoietic stem and progenitor cells (HSPCs), or their lineage-specific differentiation when supplemented with hematopoietic growth factors and/or other stimuli selected by the user. For more information, please visit: www.stemcell.com/stemspan.



MethoCult™

Semi-Solid Methylcellulose-Based Media

Detect and quantify HSPCs in colony-forming unit (CFU) assays with MethoCult™, formulated to promote optimal growth and differentiation of HSPCs in culture. For more information, please visit: www.stemcell.com/methocult.

ImmunoCult™

Activation, Expansion, Maintenance, and Differentiation of Immune Cells

Ensure optimal activation, expansion, and differentiation of immune cell subsets using ImmunoCult™ products. These immune cell culture media, activators, and supplements allow you to culture various cell types, including T cells, B cells, NK cells, dendritic cells, and macrophages, under defined stimulatory conditions for consistent and reliable results. For more information, please visit: www.ImmunoCult.com.

CellPore™

Cell Mechanoporation System for Transfection

Achieve efficient cytosolic delivery of target cargoes (e.g. nucleic acids, proteins, and small molecules) into human unactivated immune and hematopoietic stem cells, without altering cell quality, using the CellPore™ Transfection System. For more information, please visit: www.cellpore.com.

STEMvision™

Automated and Standardized Counting of CFU Assays of Human HSPCs

Remove subjectivity when counting colonies in a CFU assay using STEMvision™, an instrument with software containing standardized algorithms for imaging and counting colonies in hematopoietic CFU assays using MethoCult™ media and meniscus-free SmartDish™ cultureware. For more information, please visit: www.stemcell.com/stemvision.

CryoStor® CS10

Freeze Fresh Human Primary Cells with a Defined Cryopreservation Medium

Maximize post-thaw cell recovery and viability following cryopreservation at very low temperatures (-70°C to -196°C) with ready-to-use CryoStor® CS10 medium. For more information, please visit: www.stemcell.com/cryostor.

Notes

HUMAN PRIMARY CELLS

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