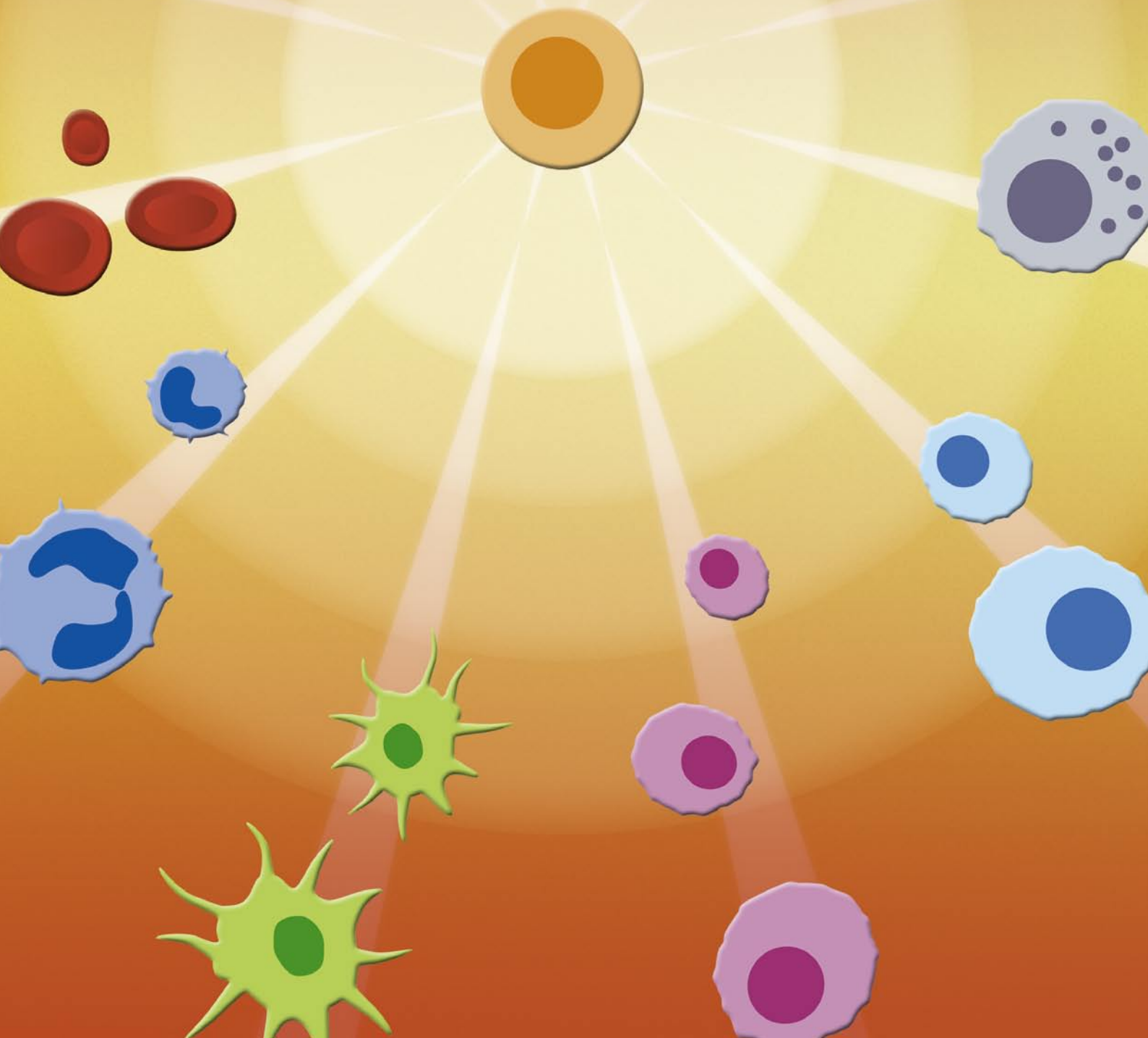




Miltenyi Biotec

Tools for human hematopoietic stem cell research

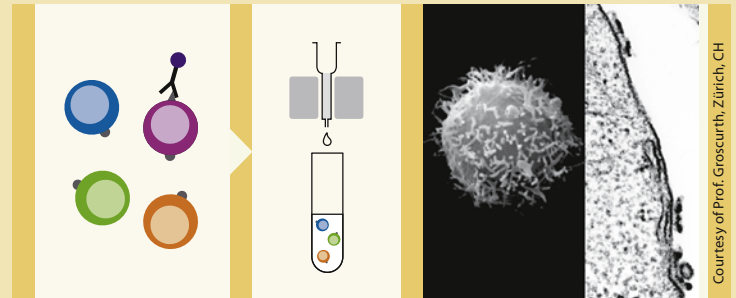


MACS® Technology—the gold standard in cell separation

MACS® Technology facilitates the fast and easy separation of cells, and comprises antibody-coupled MACS® MicroBeads, MACS Columns, and MACS Separators. MACS Separators are strong permanent magnets that induce a high-gradient magnetic field within MACS columns after column insertion. This magnetic force retains cells labeled with MACS MicroBeads and is strong enough to retain even minimally labeled cells. MACS Technology is particularly suitable to the isolation of rare cell populations—cells occurring at low frequencies—and is therefore ideal for the specific isolation of hematopoietic stem and progenitor cells.

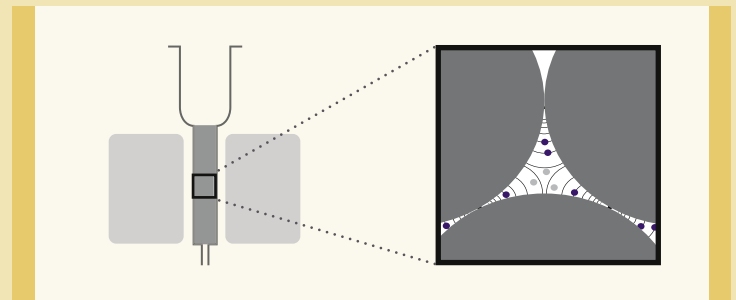
Highly specific, highly reliable

Cells are labeled with antigen-specific MACS® MicroBeads (colloidal suspensions of our patented non-toxic, biodegradable, 50 nm-sized superparamagnetic particles coupled to high-affinity monoclonal antibodies) and then pipetted into a MACS Column placed in a MACS Separator.



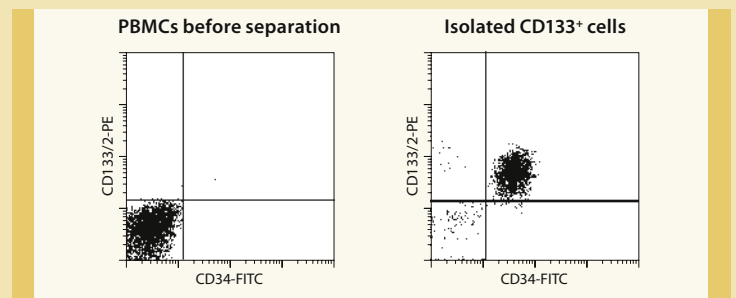
Consistent, high-quality separations

Optimal purity, recovery, and viability of separated cells due to highly specific reagents combined with the patented MACS Column Technology. Long-standing experience and rigorous quality controls have propelled MACS Technology to the forefront of cell separation technologies. The MACS Separator induces a high-gradient magnetic field within the column which effectively retains MicroBead-labeled cells. The most specific and reliable isolation of target cells is normally achieved through the direct (positive) selection of cells, especially rare cells.



Compatible with downstream applications

Gentle on cells: The minimal loading of nano-sized and biodegradable MicroBeads, short separation procedure, and the gentle nature of MACS Column Technology avoids mechanical stress and allow the purification of viable and functionally active cells. Purified cells are directly ready for subsequent flow sorting, flow cytometry, or microscopy, with no requirement for bead detachment. Also, the scatter properties of cells are not altered due to the tiny MicroBead size. Therefore, cells can be used for functional assays, transplantation experiments, as well as gene expression profiling without any restrictions.



From lab bench to clinical research applications

In addition to tools for the manual separation of cells, automated cell separation can also be achieved with the renowned autoMACS™ Pro Separator, while the CE-marked CliniMACS® Plus Instrument and Reagents permit the separation of large cell numbers in a closed and sterile system.* Miltenyi Biotec prides itself with its strong commitment to continual product development with regards to current and future basic and clinical research needs.



* In the USA, the CliniMACS® components (Reagents, Tubing Sets, Instruments and PBS/EDTA Buffer) are available for use under an approved Investigational New Drug (IND) application or Investigational Device Exemption (IDE).

Tools for cutting-edge hematopoietic stem and progenitor cell research

The hematopoietic system is resourced by stem cells that are capable of both self-renewal and differentiation into progenitor and mature blood cells of all hematopoietic lineages. Thus, it contains cells at various stages of maturation, including primitive hematopoietic stem cells (HSCs) that give rise to identical daughter cells as well as possessing multilineage differentiation capacity. On the other hand, hematopoietic progenitor cells (HPCs) have restricted differentiation potential and lack self-renewal capacity.

Miltenyi Biotec first released products for the positive selection of human CD34⁺ hematopoietic stem and progenitor cells in 1993. Since then, more than 2000 publications for CD34 cell separation testify to Miltenyi Biotec's strong commitment to the further development of high quality products and the optimization of separation strategies for the efficient and reliable separation of stem and progenitor cells.

In 1997, a further milestone was achieved by the launch of the CD34 Reagent as a CE-marked product for clinical research applications*, and was followed in the same year by the release of the CD133⁺ MicroBead Kit for basic stem cell research applications and then the CE-marked CD133 Reagent in 2001.*

Subsets of HSCs and HPCs can further be isolated by the expression of CD117 or by using the range of products available for the isolation of lineage-committed hematopoietic progenitor cells.

Miltenyi Biotec is a provider of high-quality, unique antibodies for the fluorescent analysis of hematopoietic stem and progenitor cells, including CD34⁺, CD133⁺, CD117⁺ cells in addition to various markers of lineage commitment. A panel of colony forming unit (CFU) assay media are also available for the functional characterization of hematopoietic stem and progenitor cells. Gene expression profiling of stem cells, as well as their differentiated progeny, is also possible with the stem cell-tailored PIQOR™ Stem Cell MicroArray[‡] and, when cell numbers are limited, RNA from as little as one cell can be reliably amplified for subsequent microarray analysis.

* In the USA, the CliniMACS® CD34 and CD133 Reagents are available for use only under an approved Investigational New Drug (IND) application or Investigational Device Exemption (IDE).

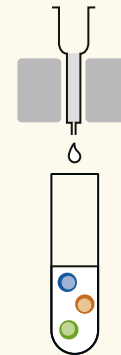
Applications:

Hematopoietic stem and progenitor cells, isolated using MACS® Technology, have extensively been used for studies on:

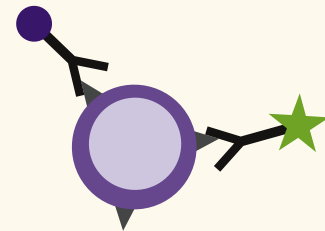
- Hematopoiesis^{1,2}
- HSC proliferation/*ex vivo* expansion³
- Stem cell plasticity^{4,5}
- Maturation, for example the generation of dendritic cells^{6,7} or red blood cells⁸
- Cellular therapy research/hematopoietic reconstitution^{7,9}
- Hematological malignancies¹⁰
- Drug discovery¹¹
- Gene therapy research¹²
- Gene expression profiling¹³

‡ PIQOR Microarray Kits are available in Europe only.

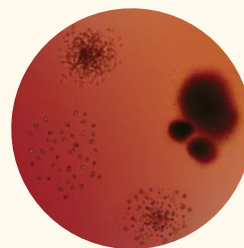
Magnetic separation



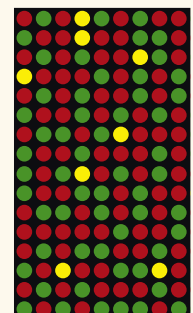
MACS Control



HSC-CFU assay



Gene expression



References

1. Majka, M. *et al.* (2001) *Blood* 97: 3075–3085.
2. Yin, A.H. *et al.* (1997) *Blood* 90: 5002–5012.[383]
3. Suzuki, T. *et al.* (2006) *Stem Cells* 24: 2456–2465.
4. Kuçi, S. *et al.* (2003) *Blood* 101: 869–876.[3966]
5. Campard, D. *et al.* (2006) *Stem Cells* 24: 1302–1314.
6. Giebel, B. *et al.* (2006) *Blood* 107: 2146–2152.
7. Bornhauser, M. *et al.* (2005) *Leukemia* 19: 161–165.
8. Giarratana, M.C. *et al.* (2005) *Nat. Biotechnol.* 23: 69–74.
9. Lang, P. *et al.* (2004) *Br. J. Haematol.* 124: 72–79.
10. Hofmann, W.K. *et al.* (2002) *Blood* 100: 3553–3560.
11. Récher, C. *et al.* (2005) *Blood* 105: 2527–2534.
12. Akimov, S. *et al.* (2005) *Stem Cells* 23: 1423–1433.
13. Wagner, W. *et al.* (2004) *Blood* 104: 675–686.

MACS® CD34 Products—the gold standard for hematopoietic stem and progenitor cell research

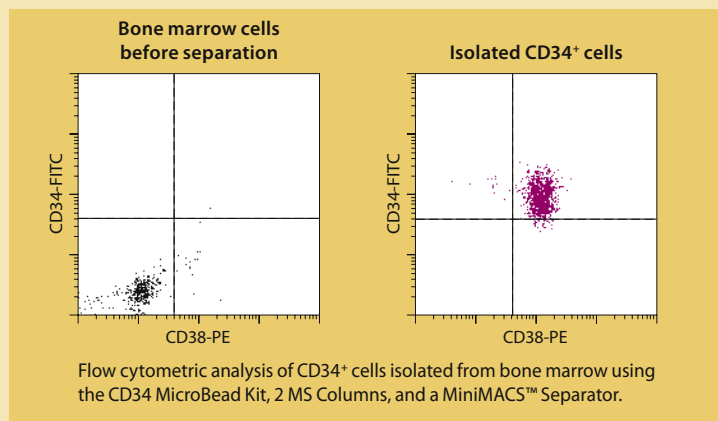
The CD34 molecule is a monomeric, heavily glycosylated type I integral transmembrane glycoprotein (sialomucin) and has three defined antibody-recognized epitopes. All CD34 MicroBead products are based on the monoclonal mouse anti-human CD34 antibody QBEND/10 which detects an invariant class II epitope present on all glycoforms.¹

CD34⁺ hematopoietic stem and progenitor cells are found in peripheral blood, leukapheresis product, cord blood, and bone marrow. Cells selected for their expression of CD34 represent a heterogeneous population of hematopoietic stem and progenitor cells that display a wide spectrum of proliferative capacities and lineage commitment. Lineage commitment and differentiation is accompanied by loss of CD90 expression and acquisition of CD38 expression.

Furthermore, CD34 is also expressed on hemangioblasts², endothelial progenitor cells^{3,4}, and mature endothelial cells⁴ as well as on embryonic stem cell lines during their differentiation to hematopoietic and endothelial lineages.⁵

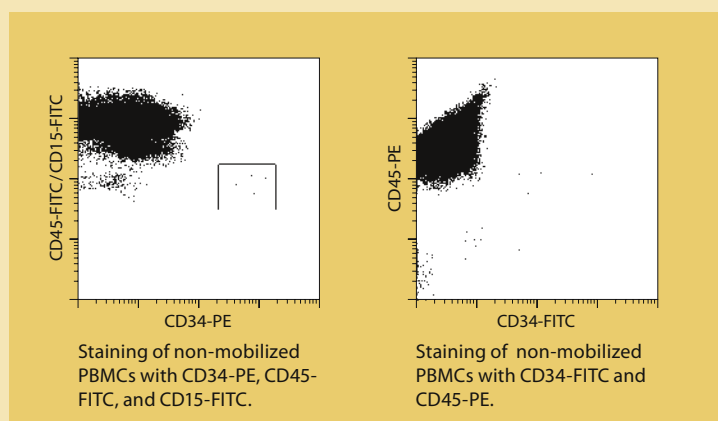
CD34 MicroBead Kit

The CD34 MicroBead Kit, formerly the Direct CD34 Progenitor Cell Isolation Kit, is a single-step labeling system which allows the fast and easy isolation of CD34⁺ cells from single-cell suspensions. It contains CD34 MicroBeads and FcR Blocking Reagent. For experiments with large cell numbers, a large-scale kit for 10¹⁰ cells is available.



CD34 Antibodies

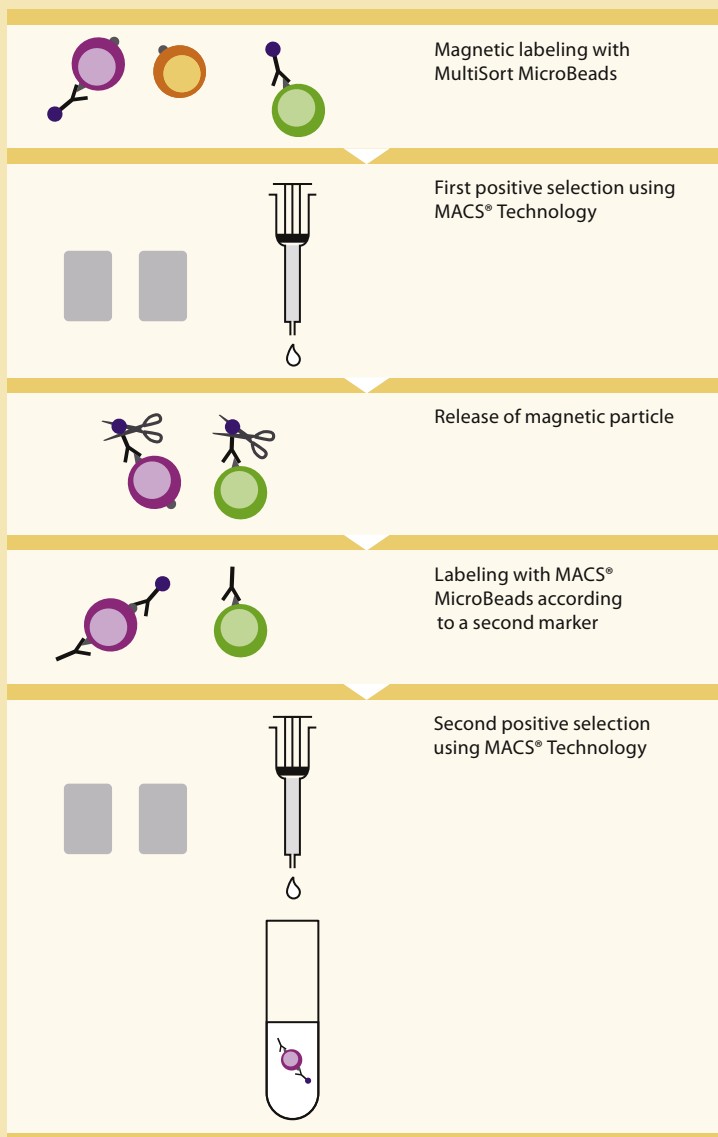
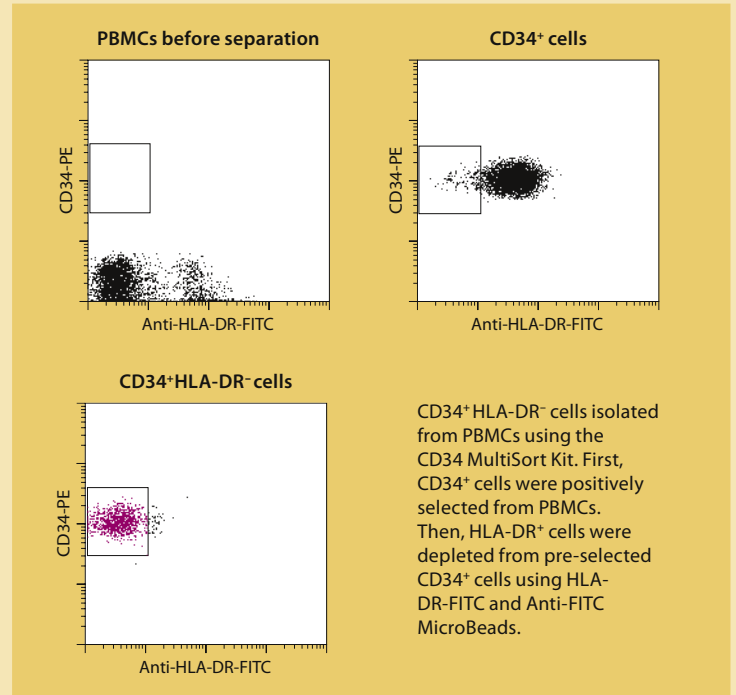
For fluorescent control staining of cells labeled with CD34 MicroBead products, the use of clone AC136 is recommended due to its recognition of a different epitope to QBEND/10. The CD34 antibody (clone AC136) is available conjugated to FITC, PE, or APC.



CD34 MultiSort Kit

The CD34 MicroBead Kit facilitates the multi-parameter separation of CD34⁺ subpopulations of cells according to a second marker. The CD34 MultiSort Kit is a complete system that contains CD34 MultiSort MicroBeads, FcR Blocking Reagent, the MultiSort Release Reagent, and MultiSort Stop Reagent. First, CD34⁺ cells are positively selected from a single-cell suspension using CD34 MultiSort MicroBeads and the magnetic particles are then enzymatically released. The selected CD34⁺ hematopoietic stem and progenitor cells can be then magnetically labeled again and sorted for a second antigen.

The CD34 MultiSort Kit can be used to isolate specific CD34 hematopoietic stem and progenitor cell subsets for research applications. For example, early hematopoietic stem and progenitor cells can be further enriched from the CD34⁺ population by subsequent enrichment of CD90 (Thy-1)⁺ cells, or the depletion of HLA-DR⁺ or CD38⁺ cells. Furthermore, human embryonic stem cell-derived hematopoietic progenitors can be separated from endothelial cells by first selecting for CD34 expression followed by an enrichment step for CD43 expression.⁵



CD34 ⁺ cell isolation		
	Capacity	Order number
CD34 MicroBead Kit	2×10 ⁹	130-046-702
	1×10 ¹⁰	130-046-703
CD34 MultiSort Kit	2×10 ⁹	130-056-701
CD34 ⁺ cell analysis		
	Conjugate	Order Number
CD34	-FITC	130-081-001
	-PE	130-081-002
	-APC	130-090-954

References

1. Lanza, F. *et al.* (2001) *J. Biol. Regul. Homeost. Agents* 15: 1–13.
2. Loges, S. *et al.* (2004) *Stem Cells Dev.* 13: 229–242.[4218]
3. Peichev, M. *et al.* (2000) *Blood* 95: 952–958.[931]
4. Rafii, S. & Lyden, D. (2003) *Nat. Med.* 9: 702–712.
5. Vodoyanik, M.A. *et al.* (2006) *Blood* 108: 2095–2105.

CD133—the primitive hematopoietic stem cell marker

The CD133 antigen is known to be a marker for primitive HSCs and HPCs and was originally found on HSCs and HPCs deriving from human fetal liver, bone marrow, and peripheral blood.¹ CD133, formerly described as AC133, is a 120 kDa five-transmembrane domain glycoprotein and possesses two antibody-recognized epitopes. The CD133 MicroBeads are based on the monoclonal mouse anti-human CD133 antibody AC133 which recognizes the CD133/1 epitope.

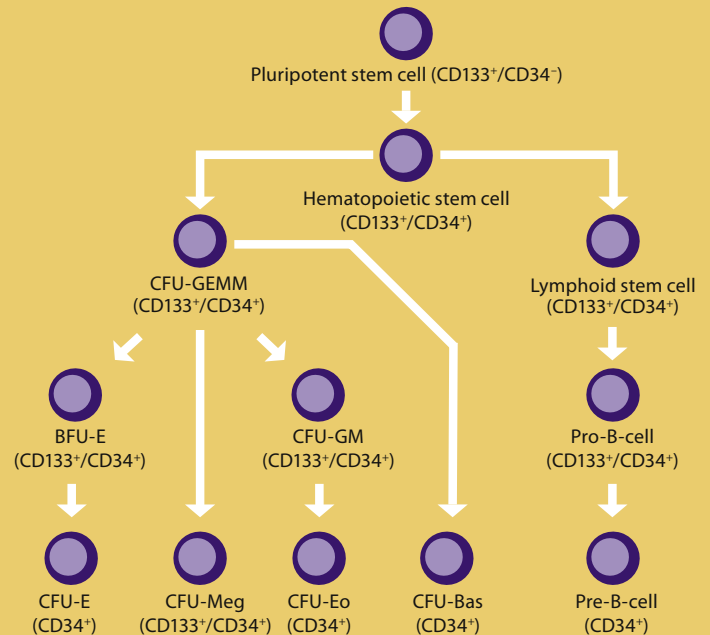
CD133 is expressed on a population of stem and progenitor cells that contain all of the CD34^{bright} and CD38⁻ progenitors as well as the CD34^{bright} cells committed to the granulocytic/monocytic pathway, but is downregulated with the granulomonocytic differentiation.¹ The primitive phenotype of CD133⁺ cells, by comparison to CD133⁻CD34⁺ cells, has been shown for cells isolated from bone marrow^{2,3}, umbilical cord blood (UCB)³, as well as CD133-selected early progenitor cells that were functionally defined to be long-term culture initiating cells (LTC-ICs) with SCID mouse repopulation capacity⁴⁻⁸. This primitive phenotype was also confirmed for CD133⁺ cells from both mobilized⁹ and unmobilized¹⁰ PBMCs. Furthermore, CD133⁺ cells show a greater capacity for both *in vitro*⁴ and *in vivo*¹¹ differentiation into dendritic cells.

CD133-CD34⁺ cells seem to be more committed to the erythroid lineage in comparison to cell fractions containing the primitive CD133⁺ cells⁹, and although approximately two thirds of the megakaryocyte progenitor population could be found in the CD133⁻CD34⁺ fraction of normal bone marrow, only the CD133⁺ cell subset contained cells that were primitive enough to produce all categories of CFU-Meg *in vitro*.¹²

Aside from their hematopoietic capacity, it has been shown that CD133⁺ cells are capable of *in vitro* differentiation into nonhematopoietic cell types, demonstrating the much higher plasticity of CD133 positive-selected cells in comparison to CD34 positive-selected cells.¹³ Furthermore, CD133 is found to be expressed on hemangioblasts¹⁴, endothelial progenitor cells^{15,16}, undifferentiated embryonic stem cell lines, for example H1, H7, and H9¹⁷⁻²⁰, and becomes down-regulated when cells obtain functional and phenotypical properties upon differentiation towards hematopoietic lineages²⁰.

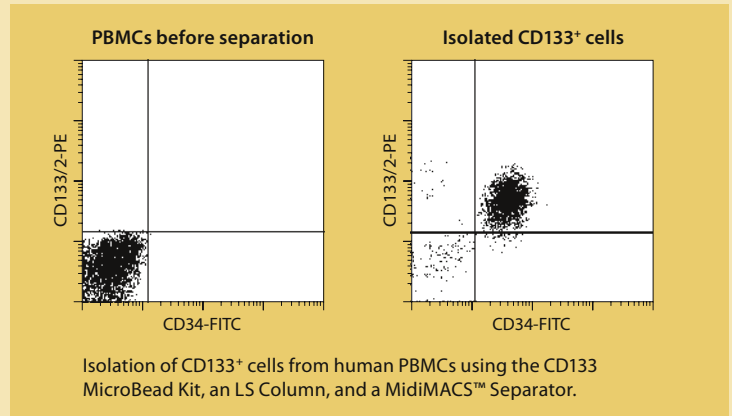
CD133-expressing cells in different hematopoietic tissues ⁴	% CD133 ⁺ cells	% CD34 ⁺ cells	% CD133 ⁺ cells in CD34 ⁺ cells
Normal bone marrow (n = 7)	0.52 ± 0.11	1.47 ± 0.23	36.3 ± 2.2
Cord blood (n = 9)	0.16 ± 0.03	0.37 ± 0.06	51.0 ± 1.6
Leukapheresis (n = 13)	1.37 ± 0.27	1.75 ± 0.31	75.3 ± 0.8

The early hematopoietic progenitor cell marker CD133 is ancestral to CD34



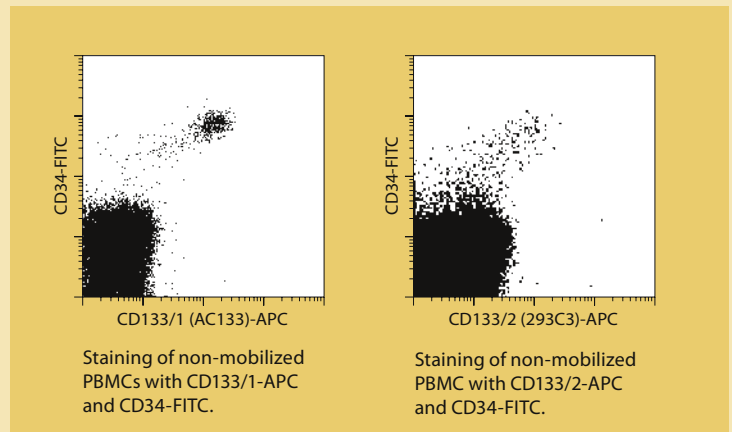
CD133 MicroBead Kit

The CD133 MicroBead Kit, formerly the CD133 Cell Isolation Kit, is a magnetic labeling system designed for the positive selection of CD133⁺ cells for research applications. The kit facilitates the single-step isolation of early hematopoietic and nonhematopoietic stem and progenitor cells.



CD133 Antibodies

After separation with the CD133 MicroBead Kit, fluorescent cell analysis should be performed with the CD133/2 (293C3) antibody as it recognizes a different epitope than the MicroBead-coupled CD133/1 (AC133) antibody. CD133⁺ tissue expression can be readily detected by Western blot using the sensitive CD133/1 (W6B3C1) antibody.



References

1. Yin, A.H. *et al.* (1997) *Blood* 90: 5002–5012.[383]
2. Buhring, H.J. *et al.* (1999) *Ann. N.Y. Acad. Sci.* 872: 25–39.
3. McGuckin, C. *et al.* (2003) *Eur. J. Haematol.* 71: 341–350.
4. De Wynter, A.E. *et al.* (1998) *Stem Cells* 16: 387–396.
5. Pasino, M. *et al.* (2000) *Br. J. Haematol.* 108: 793–800.
6. Goussetis, E. *et al.* (2000) *J. Hematother. Stem Cell Res.* 9: 827–840.
7. Summers, Y. *et al.* (2004) *Stem* 22: 704–715.
8. Suzuki, T. *et al.* (2006) *Stem Cells* 24: 2456–2465.
9. Freund, D. *et al.* (2006) *Cell Prolif.* 39: 325–332.
10. Matsumoto, K. *et al.* (2000) *Stem Cells* 18: 196–203.
11. Bornhauser M. *et al.* (2005) *Leukemia* 19: 161–165.
12. Charrier, S. *et al.* (2002) *Exp. Hematol.* 30: 1051–1060.
13. Kuci, S. *et al.* (2003) *Blood* 101: 869-876.[3966]
14. Loges, S. *et al.* (2004) *Stem Cells Dev.* 13: 229–242.[4218]
15. Peichev, M. *et al.* (2000) *Blood* 95: 952–958.[931]
16. Rafii, S. & Lyden, D. (2003) *Nat. Med.* 9: 702–712.
17. Kaufman, D.S. *et al.* (2001) *PNAS* 98: 10716–10721.
18. Carpenter, M.K. *et al.* (2003) *Cloning Stem Cells* 5: 79–88.
19. Chang, K.H. *et al.* (2006) *Blood* 108: 1515–1523.
20. Vodyanik, M.A. *et al.* (2005) *Blood* 105: 617–626.

CD133 ⁺ cell isolation		
	Capacity	Order number
CD133 MicroBead Kit	2×10 ⁹	130-050-801
CD133 ⁺ cell analysis		
	Conjugate	Order Number
CD133/1 (AC133)	-PE	130-080-801
	-APC	130-090-826
	-Biotin	130-090-664
CD133/1 (W6B3C1)	pure	130-090-422
	For Western blotting	130-092-395
	CD133/2 (293C3)	-PE
-APC		130-090-854
-Biotin		130-090-852
	pure	130-090-851

CD117—subpopulation of hematopoietic stem and progenitor cells as well as lineage-committed cells

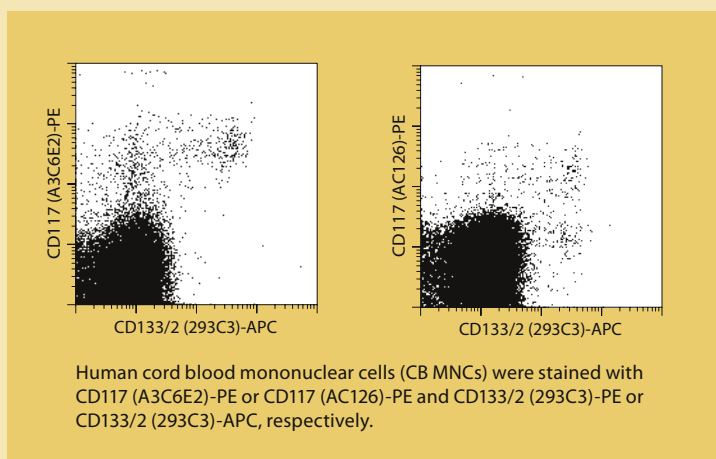
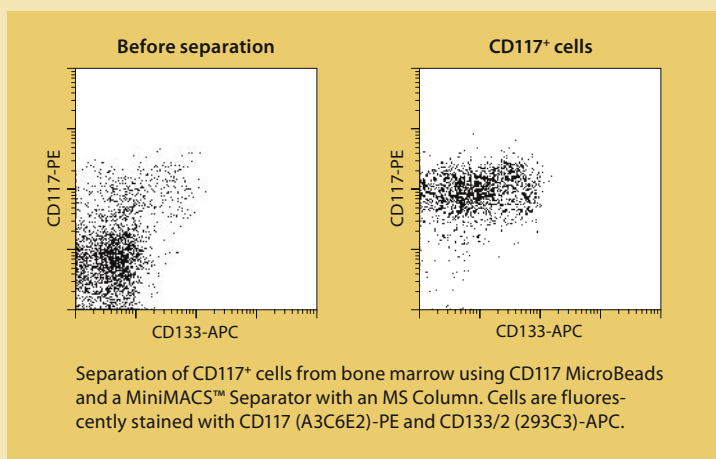
CD117, also known as c-kit, steel factor receptor, or SCF receptor, is a 145 kDa cell surface glycoprotein with tyrosine kinase activity. The molecule is suggested to be involved in signaling, activation, and proliferation of the cells. The CD117 antigen is expressed on about 1% of peripheral blood mononuclear cells and on up to 10% of bone marrow and cord blood cells. There, the majority of CD117⁺ cells were found to co-express CD133 (70–90%) and CD34 (15–35%). In addition, CD117 is also expressed on basophils, myeloid dendritic cells, TCRα/β⁺ T cells, CD19⁺ B cells, and CD56⁺ NK cells¹ as well as on mast cells, melanocyte, and AML (acute myeloid leukemia) blasts².

CD117 MicroBead Kit

The CD117 MicroBead Kit has been developed for the research-scale separation of human cells based on their expression of the CD117 antigen. The MicroBeads are conjugated to the CD117-specific monoclonal antibody AC126, which does not interfere with the binding of stem cell factor (SCF) to the CD117 receptor. The epitope recognized by AC126 is identical or in close proximity to the epitope recognized by the clone 104D2, but is different to that recognized by the clone A3C6E2. Example applications of the CD117 MicroBead Kit include the isolation of intestinal mast cells.³

CD117 antibodies

CD117 (AC126) antibodies is available conjugated to -PE. However, for quality control staining of cells separated with the CD117 MicroBead Kit, CD117 (A3C6E2) is recommended due to its recognition of a different epitope than the MicroBead-coupled antibody. CD117 (A3C6E2) potentially interferes with the SCF binding site of CD117.



References

1. Guth, S *et al.* (1995) (Abstract) 9th International Congress of Immunology.
2. Buhring, H.J. *et al.* (1991) *Leukemia* 5: 854–860.
3. Gebhardt, T. *et al.* (2005) *Gut* 54: 928–934.

CD117 ⁺ cell isolation		
	Capacity	Order number
CD117 MicroBead Kit	2×10 ⁹	130-091-332
CD117 ⁺ cell analysis		
	Conjugate	Order Number
CD117 (A3C6E2)	-PE	130-091-734
	-APC	130-091-733
CD117 (AC126)	-PE	130-091-735
	-APC	130-091-733
	Capacity	Order Number
Lineage Cell Depletion Kit	1×10 ⁹	130-092-211

Lineage-committed cells

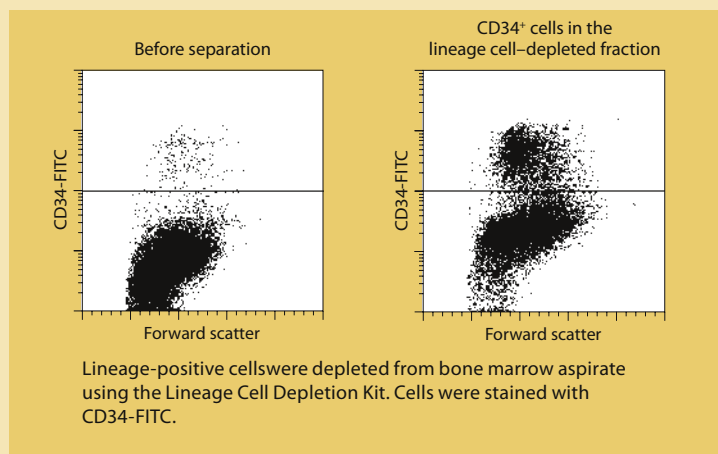
Lineage Cell Depletion Kit

The Lineage Cell Depletion Kit is an indirect magnetic labeling system for the depletion of mature hematopoietic cells in research applications, such as T cells, B cells, NK cells, dendritic cells, monocytes, granulocytes, erythroid cells, and their lineage-committed precursor cells, from bone marrow aspirate, cord blood, or mobilized leukapheresis product. The depletion of lineage-positive cells results in the enrichment of untouched stem and progenitor cells.

For depletion, cells are first labeled with a cocktail of biotin-conjugated antibodies against a panel of so-called "lineage" antigens (CD2, CD3, CD11b, CD14, CD15, CD16, CD19, CD56, CD123, and CD235a (Glycophorin A)) followed by magnetic labeling with Anti-Biotin MicroBeads.

Related Products for the isolation of committed progenitor populations:

Cells of a more-committed hematopoietic lineage can be further analyzed or isolated using lineage-specific antigens such as CD33 (an early myeloid lineage marker), CD71 (erythroid progenitors and proliferating cells), Glycophorin A (erythroid cell lineages), as well as CD13, CD7, CD10 (lymphoid-committed progenitor cells), CD19 (B cells), CD56 (NK cells), CD41a (megakaryocytic cell lineage), and CD64 (granulocyte-committed progenitor cells).



References

1. Soulier, J. *et al.* (2005) *Blood* 106: 274–286.
2. Vodyanik, M. *et al.* (2006) *Blood* 108: 2095–2105.

Product	Target cell population	Order number
CD1a MicroBeads	Early thymic progenitors*	130-051-001
CD11b MicroBeads, CD11b-FITC, -PE, -APC	Monocytoc progenitors	130-049-601
CD15 MicroBeads, CD15-FITC, -PE, -APC	Late myeloid-committed progenitors	130-046-601
CD19 MicroBeads, CD19-FITC, -PE, -APC	Mature B cells and B cell precursors**	130-050-301
CD33 MicroBeads, CD33-PE, -APC	Myeloid-committed progenitors	130-045-501
CD38 MicroBead Kit, CD38-FITC, -PE, -APC, -Biotin	Lineage-committed progenitors	130-092-263
CD43 MicroBeads	Hematopoietic stem cells***	130-091-333
CD45 MicroBeads, CD45-FITC, -PE, -APC, -Biotin	Pan-leukocytes	130-045-801
CD61 MicroBeads, CD61-PE	Megakaryocyte progenitors**	130-051-101
CD71 MicroBeads, CD71-PE, -APC	Erythroid lineage-committed progenitors and proliferating cells	130-046-201
CD235a (Glycophorin A) MicroBeads	Erythroid cell lineages	130-050-501
Anti-HLA-DR MicroBeads	Antigen-presenting cells**	130-046-101

* In combination with the CD34 MultiSort Kit and CD33 MicroBeads from thymic tissue.¹

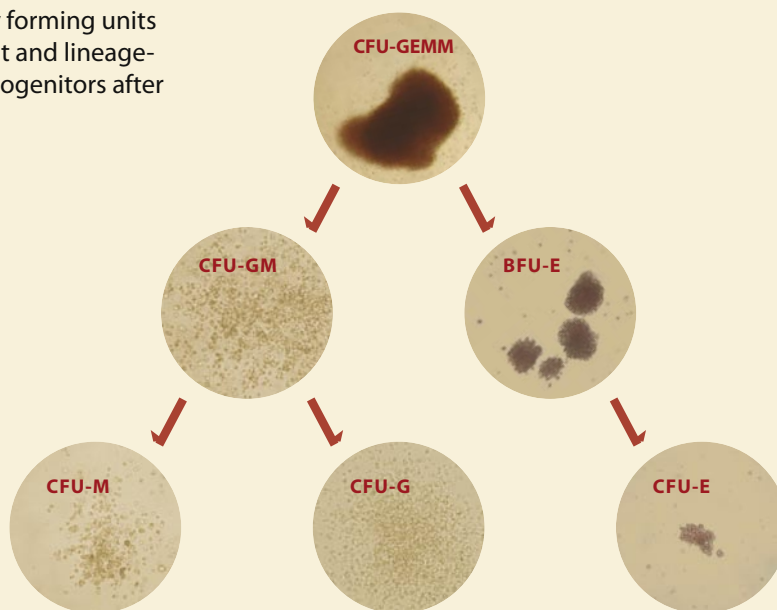
** In combination with the CD34 MultiSort Kit.

*** In combination with the CD34 MultiSort Kit from human embryonic stem cells.²

MACS® HSC-CFU Media

The MACS® HSC-CFU Media have been specially developed for the enumeration and evaluation of stem cell-derived hematopoietic progenies as characterized by their ability to form Colony Forming Units (CFUs). The media are recommended for the assaying of human clonogenic hematopoietic stem and progenitor cells from bone marrow, cord blood, peripheral blood, leukapheresis products, and CD34⁺ and CD133⁺ cell fractions enriched using MACS Technology for research applications. MACS HSC-CFU media are standardized semi-solid media that provide reliable and reproducible results for the culture of hematopoietic stem cells (HSCs).

Schematic diagram of colony forming units (CFUs) formed by multipotent and lineage-committed hematopoietic progenitors after two weeks incubation.



Volume	HSC-CFU complete with Epo	HSC-CFU complete w/o Epo	HSC-CFU lite with Epo	HSC-CFU basic
24 x 3 mL	#130-091-278	#130-091-276	#130-091-282	—
100 mL	#130-091-280	#130-091-277	#130-091-281	—
80 mL	—	—	—	#130-091-275

The formulation supports growth of:

CFU-G, CFU-M, CFU-GM	yes	yes	yes	yes / no*
BFU-E, CFU-E, and CFU-GEMM	yes	no	yes	yes / no*

Components:

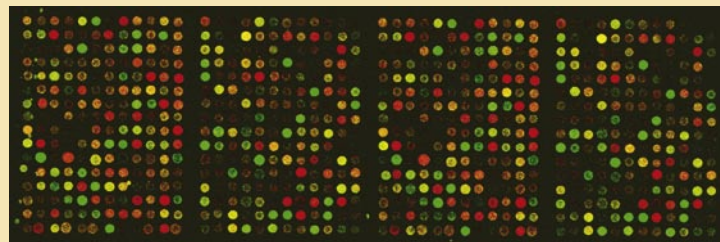
Methylcellulose in Iscove's MDM	1%	1%	1%	1%
Fetal Bovine Serum	30%	30%	30%	30%
Bovine Serum Albumin	1%	1%	1%	1%
L-Glutamine	2 mM	2 mM	2 mM	2 mM
2-Mercaptoethanol	0.1 mM	0.1 mM	0.1 mM	0.1 mM
Stem Cell Factor	(50 ng/ml)	(50 ng/ml)	(50 ng/ml)	—
GM-CSF	(20 ng/ml)	(20 ng/ml)	(10 ng/ml)	—
G-CSF	(20 ng/ml)	(20 ng/ml)	—	—
IL-3	(20 ng/ml)	(20 ng/ml)	(10 ng/ml)	—
IL-6	(20 ng/ml)	(20 ng/ml)	—	—
Erythropoietin (Epo)	(3 U/ml)	—	(3 U/ml)	—

Stem cell-specific gene expression profiling with PIQOR™ Microarrays

In addition to the broad range of products available for the isolation and phenotypic analysis of human stem cells, Miltenyi Biotec also provides tailored products for the gene expression profiling of stem cells, including the PIQOR™ Stem Cell Microarray. The SuperAmp™ Service also permits the gene expression profiling of even extremely low numbers of cells—ideal for stem and progenitor cell occurring in low frequencies from all tissue types.

PIQOR™ Stem Cell Microarray*

The PIQOR™ Stem Cell Microarray offers gene expression profiling using a microarray tailor made to suit the analysis of human stem cells. The microarray permits the quality control of different stem cell types as well as comparative gene expression studies at different stages of differentiation. The microarray is also ideal for the optimization of differentiation protocols for a variety of tissue types. PIQOR Microarrays* are of the highest quality and are manufactured under stringent, quality-controlled conditions. Each microarray contains six housekeeping genes and six control genes for a robust quantification of gene expression. Furthermore, all genes are spotted in quadruplicates. More than 900 relevant marker genes for stem cells and their differentiation processes are included on a single microarray, assembled after extensive literature searches and screening of gene expression data and bioinformatics homology analyses.



MACS™ molecular products for stem cell research

PIQOR™ Stem Cell Microarray Kit, human, antisense*	
– 4 Microarrays	130-092-033
– 8 Microarrays	130-092-034
PIQOR™ Microarray Service	
– Service Stem Cell Microarray Plus Amplification, human	160-000-765
SuperAmp™ Service (per sample)	160-000-936
μMACS™ mRNA Isolation Kit	
– Small Scale	130-075-201
– Large Scale	130-075-101
– For Total RNA	130-075-102
μMACS™ One-step cDNA Kit	130-091-902
μMACS™ One-step cDNA Labeling Kit	130-092-443
μMACS™ One-step T7 Template Kit	130-092-866

Quality control

Analysis of the expression of certain marker genes allows the quality control of human embryonic and hematopoietic stem cells to be performed (for research use only).

Human embryonic stem cells (ESCs)
NANOG, POU5F (Oct4), TERT, ZFP42, etc.

Human hematopoietic stem cells (HSCs)
CD34, CD133, CD117, etc.

SuperAmp™ Service

Available as an extension of the Microarray Service, the SuperAmp™ Service is ideally suited to the analysis of stem cell samples using either the PIQOR Stem Cell Microarray or the Agilent Whole Genome Microarray. Picogram amounts of RNA can be million-fold amplified from 1 to 100,000 cells sorted with MACS® Technology, flow cytometry, or even laser capture microdissection. The SuperAmp Service uses a unique global PCR protocol for the amplification of linear cDNA derived from mRNA extracted using magnetic bead technology. Linear amplification of minute amounts of RNA can be achieved and PCR bias avoided by the single-primer global PCR system that uses uniform annealing conditions for all transcripts and generates cDNA fragments of a consistent length.

*PIQOR Microarray Kits are available in Europe only.

MACS® Products for human hematopoietic stem cell research

Stem and progenitor cell isolation

	Total cells	Order no.
CD34 MicroBead Kit	2×10 ⁹	130-046-702
	1×10 ¹⁰	130-046-703
CD34 MultiSort Kit	2×10 ⁹	130-056-701
CD117 MicroBead Kit	2×10 ⁹	130-091-332
CD133 MicroBead Kit	2×10 ⁹	130-050-801
Lineage Cell Depletion Kit	1×10 ⁹	130-092-211

Related products

CD1a MicroBeads	1×10 ⁹	130-051-001
CD11b MicroBeads	1×10 ⁹	130-049-601
CD15 MicroBeads	1×10 ⁹	130-046-601
CD19 MicroBeads	1×10 ⁹	130-050-301
CD38 MicroBead Kit	1×10 ⁹	130-092-263
CD43 MicroBeads	1×10 ⁹	130-091-333
CD45 MicroBeads	1×10 ⁹	130-045-801
CD61 MicroBeads	1×10 ⁹	130-051-101
CD71 MicroBeads	1×10 ⁹	130-046-201
CD235a (Glycophorin A) MicroBeads	1×10 ⁹	130-050-501
Anti-HLA-DR MicroBeads	1×10 ⁹	130-046-101

Cell analysis

	Conjugate	Order no.
CD34	-FITC	130-081-001
	-PE	130-081-002
	-APC	130-090-954
	-Biotin	130-090-954
CD117 (A3C6E2)	-PE	130-091-734
	-APC	130-091-733
CD117 (AC126)	-PE	130-091-735
	-APC	130-090-826
CD133/1 (AC133)	-PE	130-080-801
	-APC	130-090-826
	-Biotin	130-090-664
	pure	130-090-422
CD133/1 (W6B3C1) pure for Western blotting		130-092-395
CD133/2 (293C3)	-PE	130-090-853
	-APC	130-090-854
	-Biotin	130-090-852
	pure	130-090-851

Related cell analysis products

	Conjugate
CD11b	-FITC, -PE, -APC
CD15	-FITC, -PE, -APC
CD19	-FITC, -PE, -APC
CD33	-PE, -APC
CD38	-FITC, -PE, -APC, -Biotin
CD45	-FITC, -PE, -APC, -Biotin
CD61	-PE
CD71	-PE, -APC

HSC-CFU media

	Volume	Order no.
HSC-CFU with Epo	24×3 mL	130-091-278
	100 mL	130-091-280
HSC-CFU without Epo	24×3 mL	130-091-276
	100 mL	130-091-277
HSC-CFU lite with Epo	24×3 mL	130-091-282
	100 mL	130-091-281
HSC-CFU basic	80 mL	130-091-275

MACSmolecular

PIQOR™ Stem Cell Microarray Kit, human, antisense*		
- 4 Microarrays		130-092-033
- 8 Microarrays		130-092-034
PIQOR™ Microarray Service		
- Service Stem Cell Microarray Plus Amplification, human		160-000-765
SuperAmp™ Service (per sample)		160-000-936
μMACS™ mRNA Isolation Kit		
- Small Scale		130-075-201
- Large Scale		130-075-101
- For Total RNA		130-075-102
μMACS™ One-step cDNA Kit		130-091-902
μMACS™ One-step cDNA Labeling Kit		130-092-443
μMACS™ One-step T7 Template Kit		130-092-866

* PIQOR Microarray Kits are available in Europe only.

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