



Miltenyi Biotec

Stem cell competence

Mouse stem cell research

Adult stem and progenitor cells

ESCs and iPS cells

Tumor-initiating cells

Sample preparation

Cell separation

Cell analysis

Expression profiling

MACS® Technology —the complete solution

The mouse model is the experimental animal model of choice for the majority of studies in stem cell research. Findings from this field have led to tremendous insights into the mechanisms of human adult and embryonic stem cells and their differentiation potential. For mouse stem cell research, the MACS Product Portfolio includes instruments and reagents sample preparation, cell separation, cell analysis, cell culture, and molecular biology.

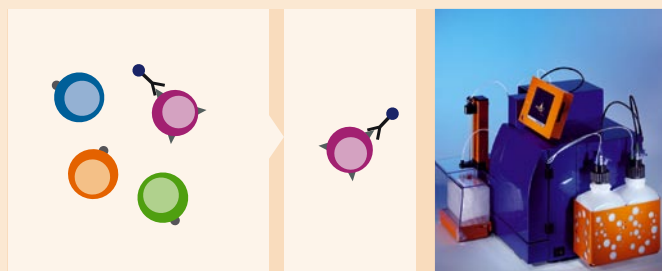
MACS Sample Preparation

The quality of an experiment strictly depends on the quality of the sample preparation. Miltenyi Biotec offers innovative instruments and reagents for fast and gentle preparation of samples from solid tissues as well as cultured cells.



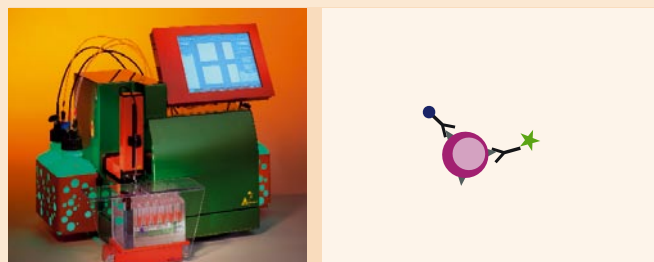
MACS Cell Separation

A large panel of MACS MicroBeads and MicroBead Kits is available for the isolation of virtually any cell type. The cells can be separated manually or in an automated fashion. The new autoMACS™ Pro Separator has been designed for automated walk-away cell sorting of multiple samples.



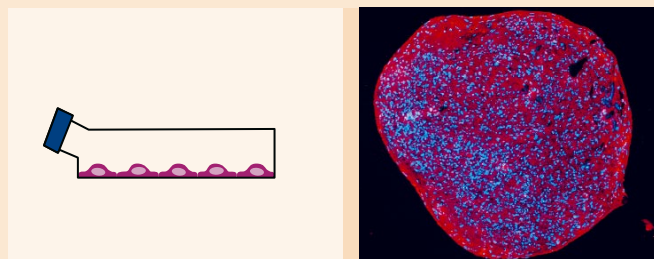
MACS Cell Analysis

Miltenyi Biotec provides a large panel of monoclonal antibodies and kits for fluorescence microscopy and flow cytometry. The innovative MACSQuant™ Analyzer is an extremely compact, easy-to-use, multicolor benchtop cell analyzer. The instrument is fully automated and enables absolute cell count.



MACS Cell Culture

The product portfolio for cell culture includes media as well as recombinant cytokines and growth factors.



MACSmolecular

Miltenyi Biotec provides products for analytical protein isolation and detection, mRNA purification and amplification, cDNA synthesis and labeling, microRNA analysis, as well as microarray technologies and instrumentation. The portfolio includes genomics services, such as gene expression and microRNA analysis microarrays, array-CGH, and bioinformatics.



The preferred choice for stem cell separation

Benefits of MACS® Technology at a glance:

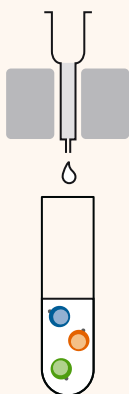
- Fast—cell separation takes less than one hour
- Gentle—separated cells remain viable and functional
- Flexible—both labeled and unlabeled fractions can be obtained with excellent purity and high recovery
- Easy separation of large cell numbers—up to 10^9 labeled cells per column

MACS Technology



Magnetic labeling

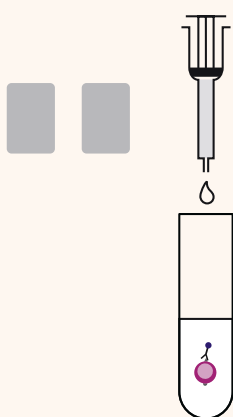
Cells of interest are labeled with MACS® MicroBeads in a short incubation step.



Magnetic separation

Labeled and unlabeled cells are separated on a MACS Column placed in the magnetic field of a MACS Separator.

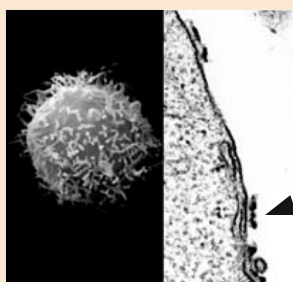
The flow-through can be collected as the non-magnetic, unlabeled cell fraction.



Elution of the labeled cell fraction

The separation column is removed from the magnetic field and the retained cells are flushed out.

Both the labeled and unlabeled fractions can be recovered and used for downstream applications.



MACS MicroBeads are nano-sized particles and are barely detectable by scanning electron microscopy. The micrograph shows a lymphocyte isolated by positive selection (left). Transmission electron micrograph of an isolated lymphocyte with MicroBeads (arrow) on the cell surface (right).

(Courtesy of Prof. Groscurth, Zürich, CH.)

Mouse stem cells

Stem cells have the capacity to self-renew and to differentiate into various cell types of the body. They promise an essentially unlimited supply of specific cell types for basic research, drug testing, and possibly for future transplantation therapies. The mouse model is an experimental animal model to investigate these cells and their potential. MACS Technology enables the isolation of numerous particular cell types and subsets at high purity.

MACS® Technology—the gold standard in cell separation

MACS Technology is based on MACS MicroBeads, MACS Columns, and MACS Separators—strong permanent magnets. MicroBeads are superparamagnetic particles coupled to specific antibodies.

Target cells can be magnetically isolated by positive selection using specific cell surface antigens or by depletion of unwanted cells in order to obtain untouched cells. Furthermore, these two separation strategies can easily be combined to provide greater flexibility for the sequential sorting of complex subpopulations of cells.

MACS MicroBeads

- Highly specific monoclonal antibody conjugates
- Small (50 nm), virus-sized nanoparticles
- Non-toxic, biodegradable
- Colloidal, for ease of handling and short incubation times

MACS Columns and MACS Separators

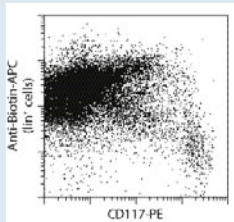
- High-gradient magnetic field
- Optimal recovery and high purity with MACS Columns
- Gentle to cells
- Automated cell separation with autoMACS™ Pro Separator

MACS MicroBeads for indirect magnetic labeling

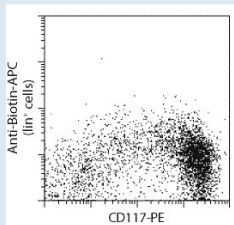
For maximum flexibility, indirect magnetic labeling with MACS MicroBeads allows the use of any primary antibody. Monoclonal or polyclonal primary antibodies can be either unconjugated, biotinylated, or fluorochrome-conjugated.

Adult mouse stem cells

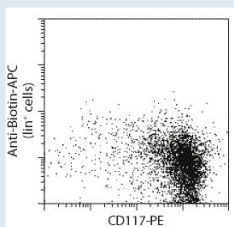
Bone marrow cells before separation



Pre-enriched lin⁻ cells after depletion of lin⁺ cells with the Lineage Cell Depletion Kit



CD117⁺ cells isolated from the lin⁻ cell fraction



Products for HSC isolation:

- Anti Sca-1 MicroBead Kit (FITC)
- CD105 MultiSort Kit
- CD117 (c-kit) MicroBeads
- Lineage Cell Depletion Kit
- CD90.2 MicroBeads
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Hematopoietic stem cells (HSCs)

Miltenyi Biotec offers a variety of products for the isolation and characterization of mouse HSCs.

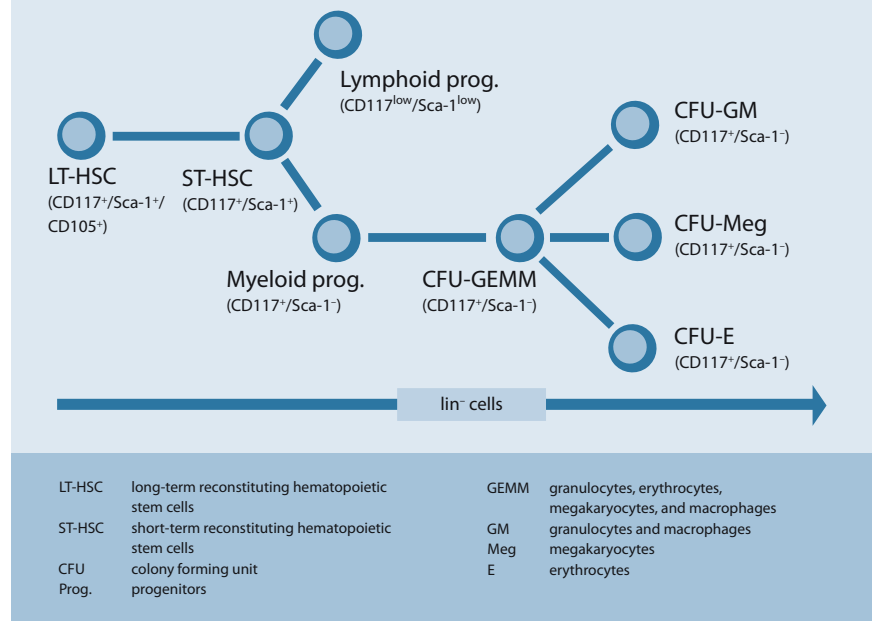
The Lineage Cell Depletion Kit has been optimized for the pre-enrichment of stem and progenitor cells from bone marrow (BM) by depleting mature and committed hematopoietic cells (HSCs). It can be used in combination with a subsequent positive selection of wanted cells, e.g., Sca-1⁺ or CD117 (c-kit)⁺ cells.

HSCs from bone marrow are defined as Sca-1⁺ CD117 (c-kit)⁺ CD90^{low/+}, and lineage marker negative (lin⁻). Furthermore, the long-term reconstituting ability (LTR-HSCs) of cells from bone marrow is highly increased in CD105⁺ and Sca-1⁺ double-positive cells²⁻⁴.

References

1. Schiedlmeier, B. *et al.* (2007) Proc. Natl. Acad. Sci. USA 104:16952–16957.
2. Chen, C.Z. *et al.* (2002) Proc. Natl. Acad. Sci. USA 99: 15468–15473.
3. Zhang, C.C. *et al.* (2005) Blood 105: 4314–4320.
4. Chen, C.Z. *et al.* (2003) Immunity 19: 525–533.

Expression of CD117(c-kit) and Sca-1 on hematopoietic stem and progenitor cells



The Anti-Sca-1 MicroBead Kit (FITC) is used for the isolation of stem cells and early progenitor cells. CD117 MicroBeads are used for the isolation of early and late stem and progenitor cells.

Did you know?

Cells that have been separated with the MACS Technology can directly be used for any downstream application including cell culture, flow cytometric analysis, and flow cytometric cell sorting.

Products for the isolation of mouse NH stem cells:

- Anti-Sca-1 MicroBead Kit (FITC)
- CD105 MultiSort Kit
- CD117 (c-kit) MicroBeads
- Lineage Cell Depletion Kit
- CD11b MicroBeads
- CD45 MicroBeads
- Anti-Ter-119 MicroBeads
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Nonhematopoietic (NH) adult stem cells

Miltenyi Biotec offers various products for isolation of NH stem cells from different mouse tissues/origins.

NH stem cells from the hematopoietic system

Lineage-negative (lin⁻) and Sca-1⁺ and / or CD117 (c-kit)⁺ cells possess the capacity to differentiate into nonhematopoietic (NH) cells, such as muscle cells^{1,2}, endothelial cells¹, hepatocytes³, and cells of the neural system⁴.

Mouse multipotent mesenchymal stromal cells (MSCs)

MSCs are often heterogeneous populations that are contaminated by lympho-hematopoietic cells⁵, hematopoietic stem cells and macrophages⁶. Contaminating cells have been depleted from MSC cultures by their expression of CD11b using CD11b MicroBeads^{5,6} as well as by depletion using a combination of Anti-Ter-119 MicroBeads and CD45 MicroBeads⁷. Multipotent, plastic adherent, fetal stem cells have been positively selected from amniocentesis cultures according to their expression of CD117 (c-kit)⁸ and showed broad differentiation potential. MSCs, expanded from bone marrow cultures, are also described to be positive for Sca-1, CD117 (c-kit), and CD105⁹.

Endothelial progenitor cells (EPCs)

EPCs play an important role for tissue engineering and angiogenesis.

They can be enriched from bone marrow using CD117 MicroBeads¹⁰.

Circulating EPCs in the blood express Sca-1 and have been successfully isolated with Anti-Sca-1 MicroBeads¹¹.

Cardiomyocytes and muscle regeneration

Lin⁻CD117⁺ cells from bone marrow show homing properties and thus favourably influence cardiac remodelling following myocardial infarction¹².

Intramyocardial implantation of myogenic differentiated cells, separated from bone marrow according to the expression of CD117 (c-kit), effectively assist the myocardial regeneration and induce therapeutic angiogenesis, contributing to functional cardiac tissue¹³.

Lin⁻Sca-1⁺CD117⁺ bone marrow-derived cells also show regeneration of damaged muscles¹⁴.

CD117⁺ bone marrow cells can adopt the function of cardiac cell lineages and may have an important therapeutic impact on ischemic heart failure¹⁵.

References

1. Orlic, D. *et al.* (2001) *Proc. Natl. Acad. Sci. USA* 98: 10344–10349.
2. Wong, S.H.A. *et al.* (2007) *Stem Cells* 25: 1364–1374.
3. Lagasse, E. *et al.* (2000) *Nat. Med.* 6: 1229–1234.
4. Sanchez-Ramos, J. *et al.* (2000) *Exp. Neurol.* 164: 247–256.
5. Kinnaird, T. *et al.* (2004) *Circ. Res.* 94: 678–685.
6. Schrepfer, S. *et al.* (2007) *Stem Cells Dev.* 16:105–107.
7. Jiang, Y. *et al.* (2002) *Nature* 418: 41–49.
8. De Coppi, P. *et al.* (2007) *Nature Biotechnol.* 25: 100–106.
9. Sun, S. *et al.* (2003) *Stem Cells* 21: 527–535.
10. Li, T.S. *et al.* (2003) *Am. J. Physiol. Heart. Circ. Physiol.* 285: H931–937.
11. Yamada, M. *et al.* (2004) *J. Immunology*, 172: 1266–1272.
12. Lutz, M. *et al.* (2008) *Cardiovasc. Res.* 77: 143–150.
13. Li, T.S. *et al.* (2005) *Circulation* 111: 2438–2445.
14. Yoshimoto, M. *et al.* (2005) *Stem Cells* 23: 610–618.
15. Kajstura, J. *et al.* (2005) *Circ. Res.* 96: 127–137.

Miltenyi Biotec products for tissue-specific mouse stem cells and TICs:

- Anti-Sca-1 MicroBead Kit (FITC)
- Anti-Prominin-1 MicroBeads
- CD117 (c-kit) MicroBeads
- CD90.2 MicroBeads
- Lineage Cell Depletion Kit
- CD45 MicroBeads
- Anti-Ter-119 MicroBeads
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Tissue-specific stem cells

MACS Technology also allows the isolation of tissue-specific stem cells from the respective organs and tissues. These stem cells can be isolated according to their expression of Sca-1. Tissue-specific stem cells were observed in kidney¹, mammary gland², liver³, and prostatic tissue^{4,5}.

The delivery of myogenic stem cells to the sites of muscle lesions could be archived with Sca-1⁺ CD34⁻-sorted cells from muscle⁶.

Sca-1⁺ cells in the adult murine heart have multipotent differentiation potential and may contribute to the regeneration of injured hearts⁷.

It has also been reported that Prominin-1⁺ (the murine ortholog of human CD133) CD45⁻ Ter-119⁻ CD31⁻ cardiac stem cells exists in brown adipose tissue⁸.

CD90.2 MicroBeads have been used to isolate spermatogonial stem cells from neonatal and adult testes of the mouse⁹. These cells have also been enriched using a CD9 antibody in combination with indirect MicroBeads¹⁰. Furthermore, spermatogonia were immunomagnetically isolated via CD117 (c-kit)¹¹ or CD326 (Ep-CAM)¹².

Hepatic progenitor cells can be enriched from adult liver by immunomagnetic depletion of Ter-119⁺ cells followed by positive selection of CD24⁺ cells¹³.

References

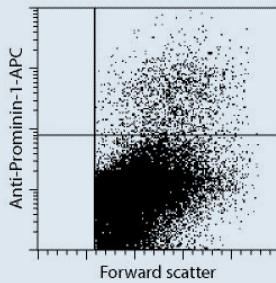
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6. Torrente, Y. *et al.* (2003) *J. Cell Biol.* 162: 511–520.
7. Matsuura, K. *et al.* (2004) *J. Biol. Chem.* 279:11384–11391.
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9. Kubota, H. *et al.* (2004) *Biol. Reprod.* 71: 722–731.
10. Kanatsu-Shinohara, M. *et al.* (2004) *Biol. Reprod.* 70: 70–75.
11. Kwon, I.K. *et al.* (2004) *Biol. Reprod.* 71:1430–1436.
12. Corallini, S. *et al.* (2006) *Reproduction* 132: 887–897.
13. Ochsner, S.A. *et al.* (2007) *Stem Cells* 25: 2476–2487.

Did you know?

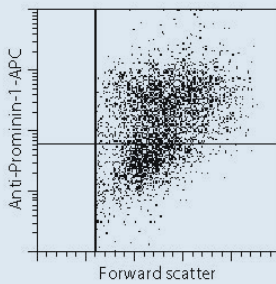
MACS[®] MicroBeads have been successfully used for magnetic resonance imaging (MRI).^{1–3}

1. Sykova and Jendelova (2005) *Ann. N.Y. Acad. Sci.* 1049: 146–160.
2. Jendelova *et al.* (2005) *Cell Transplant.* 14: 173–182.
3. Pirko *et al.* (2005) *NeuroRx* 2: 250–264.

Mouse cerebellum before separation*



Enriched Prominin-1⁺ cells



Miltenyi Biotec products for neural stem cell isolation:

- Anti Prominin-1 MicroBeads
- Anti-A2B5 MicroBeads
- Anti-PSA-NCAM MicroBeads
- MicroBeads for indirect magnetic labeling
- Neural Tissue Dissociation Kits
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Neural stem and progenitor cells

Neuroepithelial stem cells

Prominin-1, the murine ortholog of human CD133, was originally identified in mouse neuroepithelial stem cells¹. Multipotent neural stem cells (NSCs) in the murine postnatal cerebellum can be isolated according to their expression of Prominin-1 in conjunction with their lack of expression of certain lineage-indicative markers (PSA-NCAM⁻ TAPA-1⁻ O4⁻)². Isolated Prominin-1⁺ Lin⁻ cells form self-renewing neurospheres can differentiate *in vitro* into astrocytes, oligodendrocytes, and neurons. Moreover, they can regenerate each of these lineages after transplantation into the cerebellum.

Glial progenitor cells

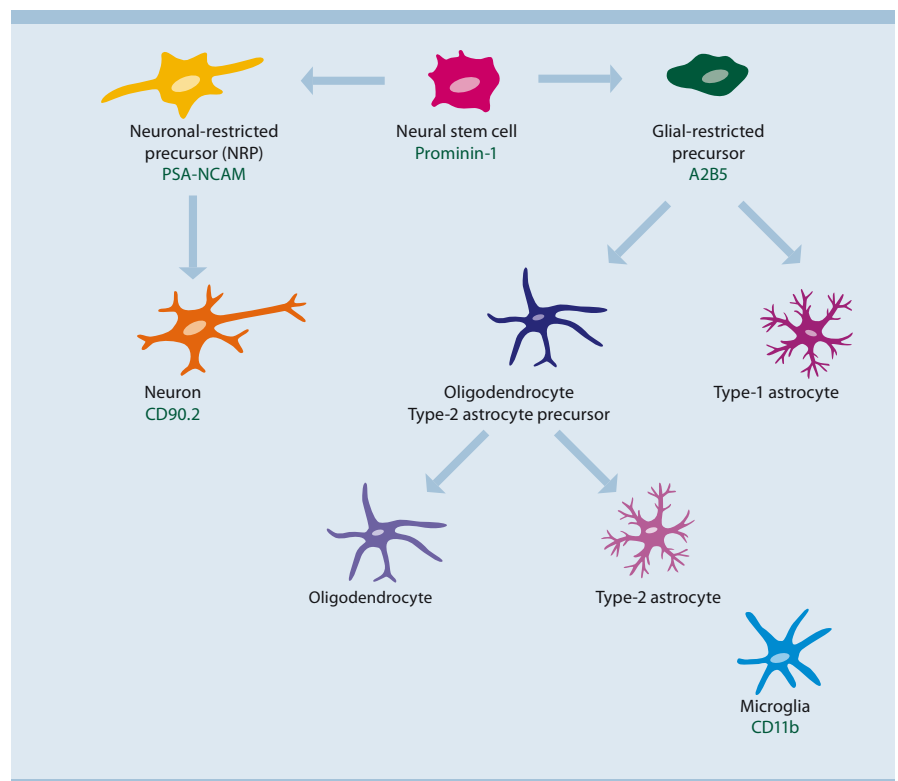
A2B5, an antigen localized on the cell surface of glial progenitor cells, has been shown as an ideal marker for immunomagnetic isolation of these cells.³⁻⁶

Neuronal progenitor cells

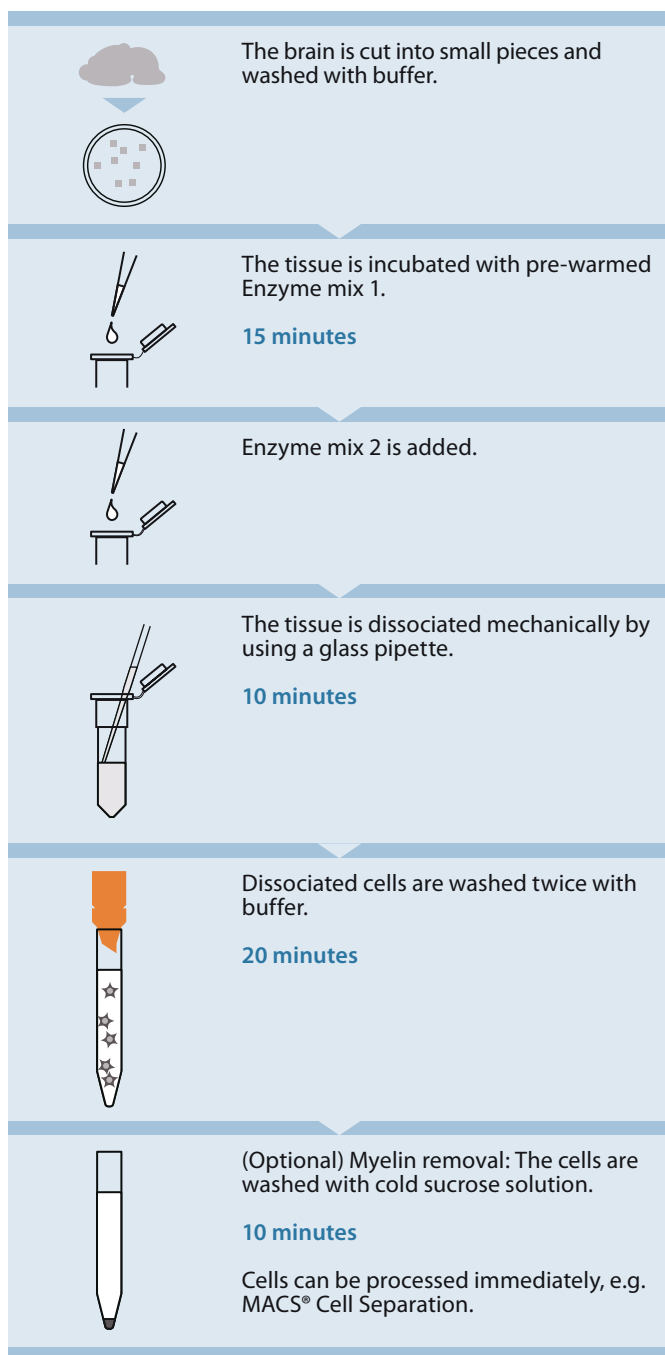
Anti-PSA-NCAM MicroBeads have been developed for the isolation of PSA-NCAM⁺ cells. The Anti-PSA-NCAM antibody recognizes polysialic acid (PSA) which, in vertebrates, is linked to the extracellular domain of the neural cell adhesion molecule (CD56, NCAM)⁷. Antibodies against PSA-NCAM have been used to immunomagnetically isolate neuronal progenitors from postnatal mice forebrain.^{4,5}

References

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2. Lee, A. *et al.* (2005) Nat. Neurosci. 8: 723–729.
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5. Seidenfaden, R. *et al.* (2006) MACS&more 10(1): 4–6.
6. Larsen, P.H. *et al.* (2004) J. Neurosci. 24: 7597–7603.
7. Rougon, G. and Marshak, D.R. (1986) J. Biol. Chem. 261: 3396–3401.



From stem cells to neurons and glia: neural lineage cells and their markers. Specific MicroBeads are available for the cell isolation according to the antigens marked in green.



Dissociation of neural tissue using the Neural Tissue Dissociation Kits.

MACS® Neural Tissue Dissociation Kits

The Neural Tissue Dissociation Kits, based on papain and trypsin, have been developed for the gentle and efficient generation of single-cell suspensions from neural tissues. Single-cell suspensions from neural tissues can be prepared in less than one hour.

- Two-step enzymatic dissociation procedure
- Gentle to cells
- High cell viability
- For whole brain and tissue sections
- For embryonic and adult neural tissues
- Available in papain or trypsin format
- Optimized for subsequent MACS Cell Separation

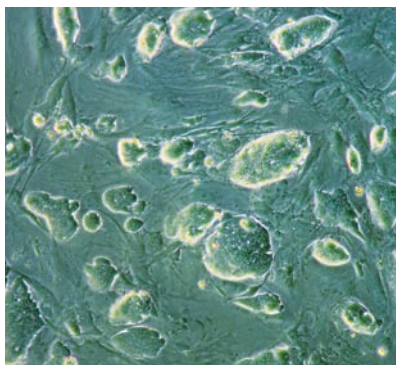
Optimized protocols are available for the use of the MACS® Neural Tissue Dissociation Kits in combination with the gentleMACS™ Dissociator.

Did you know?

The gentleMACS Dissociator is designed for the preparation of single-cell suspensions from various tissues. Miltenyi Biotec continuously expands the range of specific applications for the gentleMACS Dissociator.

Watch out for new gentleMACS Programs and Protocols at www.miltenyibiotec.com.

ESCs and iPS cells



MACS® Products for ESC separation

- CD15 (SSEA-1) MicroBeads
- CD117 MicroBeads
- Anti-Sca-1 MicroBeads (FITC)
- Anti-Prominin-1 MicroBeads
- Annexin V MicroBead Kit
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Embryonic stem cells (ESCs) and induced pluripotent stem (iPS) cells

Mouse ESCs and iPS cells express the surface marker CD15 (SSEA-1). To eliminate spontaneously differentiated cells or feeder cells (e.g. before differentiation experiments) SSEA-1⁺ cells can be isolated by using MicroBeads for indirect magnetic labeling¹⁻³, or by using CD15 (SSEA-1) MicroBeads.

CD15 (SSEA-1) MicroBeads can also be used to eliminate unwanted remaining pluripotent cells in ESC-derived differentiation cultures.

Prominin-1 expression is restricted to peripheral regions of ESC colonies and seems to be expressed by ESCs that just started to differentiate⁴. Therefore, the Anti-Prominin-1 MicroBeads can be used to obtain pluripotent cells by depleting the early differentiated cells. The Annexin-V MicroBeads can be used to deplete apoptotic cells from ESC cultures⁵.

The generation of iPS cells can be enhanced by enrichment of CD15 (SSEA-1)⁺ cells⁶.

During the reprogramming of mouse fibroblasts to iPS cells, CD15 (SSEA-1) is one of the first pluripotency markers that is expressed⁷.

ESC-derived or iPS cell-derived progenitors

Differentiation of ESCs towards defined cell populations, e.g., for *in vivo* tissue regeneration experiments, is one of the major goals in mouse stem cell research. MACS® Technology can be used to deplete unwanted cells during the differentiation process or to enrich the cells of interest via positive selection. CD117 MicroBeads have been used to separate ESC-derived HSCs⁸.

Large numbers of endothelial cells with high purity were obtained using Sca-1⁺ cells, immunomagnetically isolated from pre-differentiated ESCs⁹. Additionally smooth muscle cells can be differentiated from ESCs via the isolation of Sca-1⁺ cells¹⁰.

References

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10. Zampetaki, A. *et al.* (2007) *Am. J. Physiol. Cell Physiol.* 293: C1226–C1238.

Tumor-initiating cells (TICs)

MACS® Products for TIC separation

- Lineage Cell Depletion Kit
- CD117 (c-kit) MicroBeads
- Anti-Sca-1 MicroBead Kit (FITC)
- CD90.2 MicroBeads
- MicroBeads for indirect magnetic labeling

For more details please see pages 10 and 11.

Tumor-initiating cells (TICs)

The Lineage Cell Depletion Kit has been used to pre-enrich tumor-initiating cells (TICs, also known as cancer stem cells) from bone marrow¹. The progress of pre-TICs from BM towards cancer is associated with the upregulation of CD117 (c-kit) and Sca-1¹.

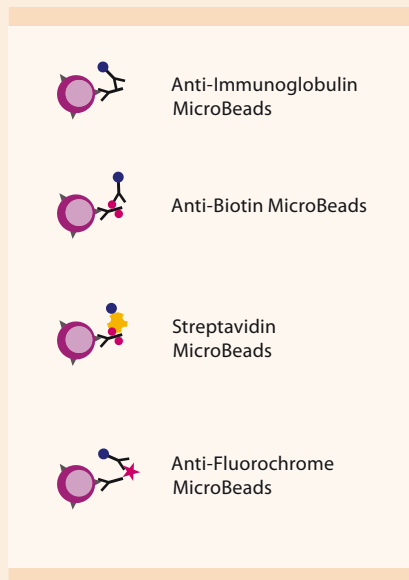
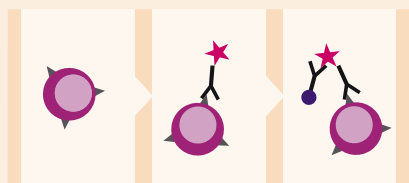
Sca-1 is also expressed on bronchioalveolar stem cells as well as on their transformed counterparts that give rise to adenocarcinoma².

Tumor-initiating cells in breast tumors of the mouse mammary express CD90.2 and CD24³.

References

1. Chen, L. *et al.* (2007) *Plos One* 2: e293.
2. Kim, C.F. *et al.* (2005) *Cell* 121: 823–835.
3. Cho, R.W. *et al.* (2008) *Stem cells* 26; 364–371.

MACS Products for indirect magnetic labeling



Indirect labeling is a convenient alternative when direct magnetic labeling is not possible or if established primary antibodies shall be used. As a primary antibody, a specific monoclonal or polyclonal antibody, directed against any cell surface marker can be used for this labeling strategy. The primary antibody can either be unconjugated, biotinylated, or fluorochrome-conjugated. The magnetic labeling is then achieved with Anti-Immunoglobulin MicroBeads, Anti-Biotin MicroBeads, or Anti-Fluorochrome MicroBeads. Alternatively, a cocktail of primary antibodies can be used to concurrently isolate or deplete a number of cell types. Indirect labeling is also the method of choice when dimly expressed markers serve as targets, because it amplifies the magnetic labeling.

- Enrichment or depletion of virtually any cell type
- For conjugated or unconjugated primary antibodies
- Compatible with fluorescent staining for flow cytometric or microscopic analysis

Anti-Fluorochrome MicroBeads

- For magnetic separation of cells stained with fluorochrome-conjugated primary antibodies
- Separated cells can directly be analyzed by flow cytometry or microscopy

Anti-Biotin MicroBeads, Streptavidin MicroBeads

- For magnetic cell sorting with biotinylated primary antibodies
- Anti-Biotin MicroBeads for most efficient magnetic labeling—even of cells with weakly expressed antigens
- Anti-Biotin MicroBeads do not bind to free biotin

Anti-Immunoglobulin MicroBeads

- For magnetic sorting of cells labeled with antibodies from various sources, for example, mouse, rat, or rabbit

MACS® Products for indirect magnetic labeling

Product	Order no.
Anti-FITC MicroBeads	130-048-701
Anti-PE MicroBeads	130-048-801
Anti-APC MicroBeads	130-090-855
Anti-Cy5/Anti-Alexa Fluor 647 MicroBeads	130-091-395
Anti-Cy7 MicroBeads	130-091-652
Anti-Biotin MicroBeads	130-090-485
Streptavidin MicroBeads	130-048-101
Mouse Anti-Rat Kappa MicroBeads	130-047-401
Goat Anti-Rat IgG MicroBeads	130-048-501
Goat Anti-Rabbit IgG MicroBeads	130-048-602
Rat Anti-Mouse IgG1 MicroBeads	130-047-101
Rat Anti-Mouse IgG2a+b MicroBeads	130-047-201
Rat Anti-Mouse IgM MicroBeads	130-047-301
Goat Anti-Mouse IgG MicroBeads	130-048-401

MultiSort Kits (releasable, for multiple cell sorting)

Anti-FITC MultiSort Kit	130-058-701
Anti-PE MultiSort Kit	130-090-757
Anti-APC MultiSort Kit	130-091-255
Anti-Biotin MultiSort Kit	130-091-256

MACS® Products for mouse stem cell research—product overview

MACS Cell Separation products

Product		Order no.
Anti-Sca-1 MicroBead Kit (FITC)	P	130-092-529
CD105 MultiSort Kit (PE)	P	130-092-924
CD117 (c-kit) MicroBeads	P	130-091-224
Anti-Prominin-1 MicroBeads	P/D	130-092-333
Lineage Cell Depletion Kit	U	130-090-858
CD11b MicroBeads	D	130-049-601
CD45 MicroBeads	D	130-052-301
CD15 (SSEA-1) MicroBeads	P/D	Coming soon
Anti-A2B5 MicroBeads	P/D	130-093-388
Anti-PSA-NCAM MicroBeads	P/D	130-092-966
CD90.2 MicroBeads	P/D	130-049-101
Anti-Ter-119 MicroBeads	D	130-049-901

P = positive selection; D = depletion; U = untouched isolation

MACS Cell Culture products

Product	Order no.
Media	
DMEM	130-091-437
DMEM with stable glutamine	130-091-438
RPMI 1640	130-091-440
RPMI 1640 with stable glutamine	130-091-439
Product	Packing unit
Cytokines & Growth Factors*	
EGF	100 µg/ 500 µg
Flt3-Ligand	10 µg
G-CSF	2 µg/ 10 µg/ 100 µg
GM-CSF	2 µg/ 10 µg/ 100 µg
IL-3 (135 aa)	2 µg/ 10 µg
IP-10 (CXCL10)	5 µg
M-CSF	10 µg
MIG (CXCL9)	20 µg
MIP-3β (CCL19)	5 µg/ 20 µg/ 100 µg
SCF	2 µg/ 10 µg/ 100 µg
SDF-1α (CXCL12)	2 µg
TPO	2 µg/ 10 µg
VEGF (164 aa) (InCs)	5 µg/ 10 µg

* For a complete list of available cytokines, please visit www.miltenyibiotec.com/cytokines

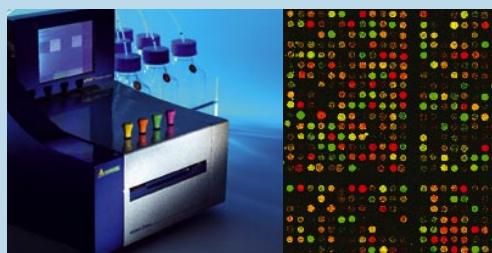
** also known as SSEA-1; cross-reactive with mouse

MACS Cell Analysis products

Antibody	Conjugate	Order no.
Anti-Sca-1	FITC	130-093-222
	PE	130-093-224
	APC	130-093-223
	Biotin	130-093-421
CD117	PE	130-091-730
	APC	130-091-729
CD105	PE	130-092-929
	APC	130-092-930
	Biotin	130-092-927
	pure	130-092-926
Lineage Cell Detection Cocktail	Biotin	130-092-613
CD90.2	FITC	130-091-602
	PE	130-091-601
	APC	130-091-790
CD11b	FITC	130-081-201
	PE	130-091-240
	APC	130-091-241
CD45	FITC	130-091-609
	PE	130-091-610
	APC	130-091-811
Anti-A2B5	pure	130-093-394
Anti-PSA-NCAM	PE	130-093-274
	APC	130-093-273
CD15, human**	FITC	130-081-101
	PE	130-091-375
	APC	130-091-371
Anti-Ter-119	FITC	130-091-786
	PE	130-091-783
	APC	130-091-788

MACS Products for sample preparation

Product	Components	Order no.
Neural Tissue Dissociation Kit (P)		130-092-628
Neural Tissue Dissociation Kit (T)		130-093-231
gentleMACS™ Starting Kit		130-093-235
C Tubes	25 tubes, single-packed	130-093-237
M Tubes	25 tubes, single-packed	130-093-236
	50 tubes per bag	130-093-458



a-Hyb™ Hybridization Station

mRNA isolation/cDNA synthesis

μMACS™ mRNA Isolation Kit

Small Scale # 130-075-201

Large Scale # 130-075-101

For Total RNA # 130-075-102

μMACS™ mRNA Isolation Starting Kit # 130-075-202

μMACS™ One-step cDNA Kit # 130-091-902

μMACS™ One-step cDNA Starting Kit # 130-091-989

PIQOR™ Microarray Kit *

PIQOR™ Stem Cell Microarray Kit, antisense

4 Microarrays # 130-092-037

8 Microarrays # 130-092-036

PIQOR™ Microarray Service **

Service Stem Cell Microarray Plus Amplification # 160-000-766

SuperAmp™ Amplification ***

SuperAmp™ Service (per sample) # 160-000-936

miRXplore™ Microarray Kit

4 Microarrays # 130-093-254

8 Microarrays # 130-093-272

miRXplore™ Microarray Services

miRXplore™ Microarray Service # 160-001-143

miRXplore™ Universal Reference Service # 160-001-161

miRXplore™ Additional Total RNA Extraction # 160-001-162

Stem cell differentiation tracking by gene expression profiling

MACS™ molecular provides a highly innovative range of products and services with a strong focus on gene expression profiling. Particularly when isolating stem cells, sensitive downstream analyses are required.

One-step mRNA isolation and in-column cDNA synthesis

Premium mRNA is isolated within 15 minutes directly from cells or tissues. The μMACS™ One-step cDNA Kit combines efficient magnetic isolation of mRNA with revolutionary in-column cDNA synthesis. Purified cDNA can be generated from just a few to as many as 10⁷ cells.

PIQOR™ Stem Cell Microarray

The PIQOR™ Stem Cell Microarray comprises 942 relevant marker genes for human stem cells and their differentiation. It is available as a convenient microarray kit* or within the scope of the microarray service**. Gene expression experiments allow for the quality control of different stem cell types, comparison between different stages of differentiation, as well as the optimization of differentiation protocols.

SuperAmp™ Service ***

When the number of stem cells for analysis is low, Miltenyi Biotec offers the ideal solution for gene expression profiling needs. The SuperAmp™ Service (available as an extension of the PIQOR™ Microarray Service) can reliably amplify mRNA million-fold from as little as one cell. The service is ideal for stem cells sorted with MACS® Technology, flow cytometry, or even from laser capture microdissected tissue.

miRXplore™ Kits and Services

Explore microRNA expression in human and mouse stem cells with the new miRXplore™ Microarray Kits and Services. Designed in collaboration with experts at the Rockefeller University¹, the microarray covers more than 2700 human, mouse, rat, and viral microRNA sequences and possess rigorous internal control system. Sequences differing by just one oligonucleotide can be reproducibly detected and re-ratios calculated with the use of the proprietary miRXplore Universal Reference.

Reference

1. Landgraf, P. *et al.* (2007) *Cell* 129: 1401–1414.

* PIQOR™ Microarray Kits are not available in the US and Canada.

** Microarray Service includes all experimental steps from RNA isolation to primary data analysis. Final data are returned including an extensive written report. Further Bioinformatics Services, such as pathway or cluster analysis, are also available.

*** In combination with the Microarray Services only. The SuperAmp Service is not available for microRNA amplification.



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