



Miltenyi Biotec

StraightFrom® MicroBeads

Cell isolation directly from blood products



MACS® Technology

A perfect match of MACS® Columns and MicroBeads

MACS® MicroBead Technology is the most trusted and proven cell isolation technology that meets all your cell isolation needs.

Pivotal to this technology are our patented MACS Columns. Steel spheres inside the column matrix amplify the magnetic field 10,000-fold. This allows for minimal labeling and the smallest bead size: Target cells are labeled with nano-sized MicroBeads (~50 nm) via antibodies and gently retained inside the column to optimize separation results and preserve full cell functionality.

- Minimal labeling and smallest bead size – preserved characteristics and no cell activation
- No cell stress – highest viability and no effects on cell functionality
- Cells can be directly used in downstream applications – free epitopes and no bead aggregates

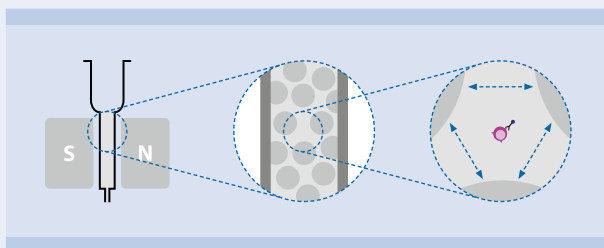


Figure 1: The MACS Column at a glance. Cells move freely between the steel spheres inside the column and are only retained by magnetic forces. Spaces between the spheres are up to 20x the cell's size.

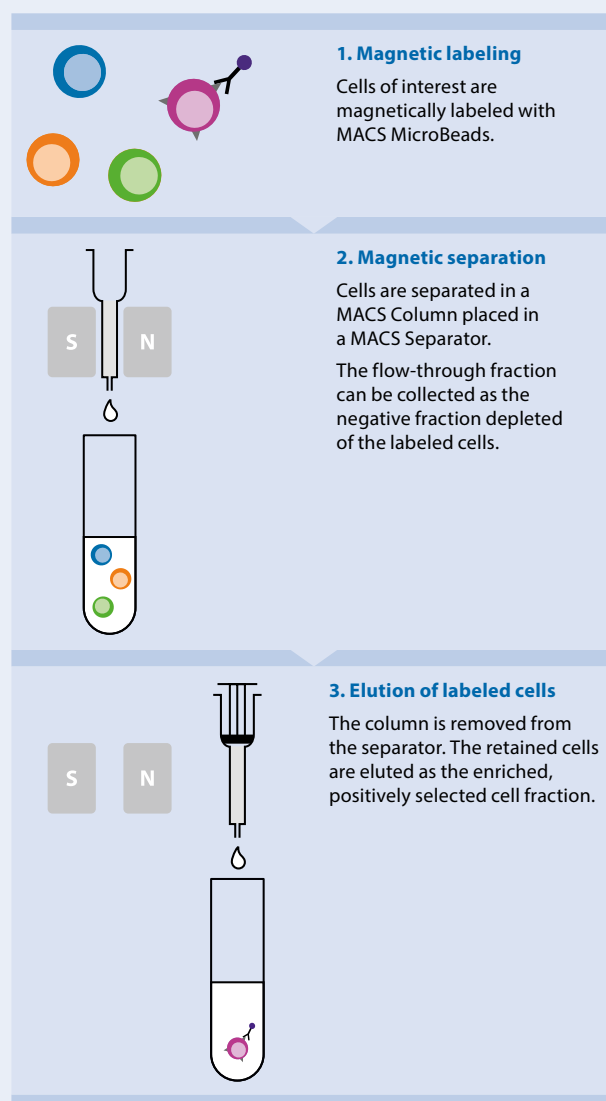


Figure 2: Three easy steps of MACS MicroBead Technology to isolate your cells of interest.

StraightFrom® MicroBeads

Quick and easy cell isolation directly from blood

StraightFrom® MicroBeads allow magnetic cell separation of various leukocyte subsets directly from different starting materials such as whole blood, buffy coat, leukocyte reduction system chamber (LRSC), and Leukopak®. Leukocytes consist of peripheral blood mononuclear cells (PBMCs) and granulocytes.

Conventional protocols require isolation of PBMCs by density gradient centrifugation before target cell isolation. The innovative StraightFrom Technology omits this time-consuming step. Subsets are purified either automated or manually using the appropriate magnetic separator and

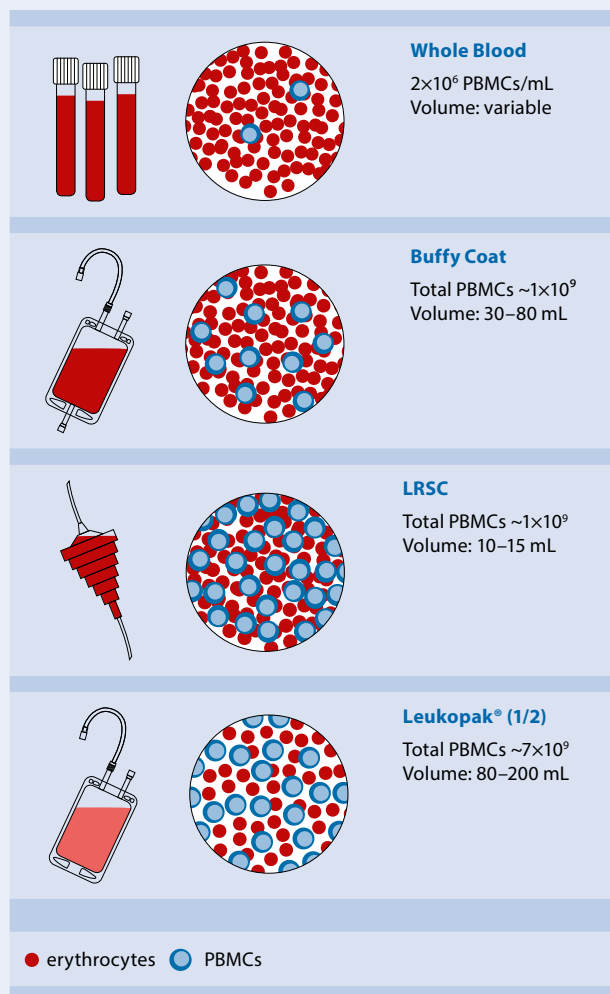


Figure 3: Starting materials used for PBMC isolation.

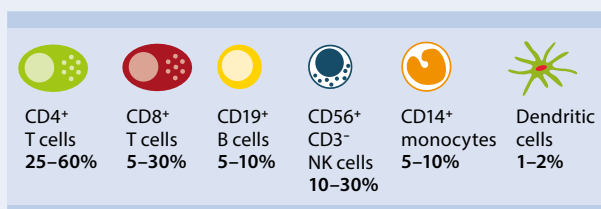


Figure 4: The PBMCs contain leukocyte subsets of different frequencies.

StraightFrom MicroBeads. The isolated target cells are immediately ready for any cellular and molecular analysis. Depending on the starting material, volumes and leukocyte concentrations highly differ. To match this, StraightFrom MicroBead Kits have been developed for each starting material to optimize cell separation results in terms of cell purity and recovery rates. With these kits, isolation of leukocyte subsets has never been easier and quicker compared to the conventional methods since there is no density gradient centrifugation needed. Eliminating unnecessary steps during cell separation decreases user-dependent variability, leading to a reliable and standardized solution.

- No density gradient centrifugation, erythrocyte lysis, or cell counting needed
- Fast cell isolation in less than 30 minutes
- Simple protocol with only a few handling steps

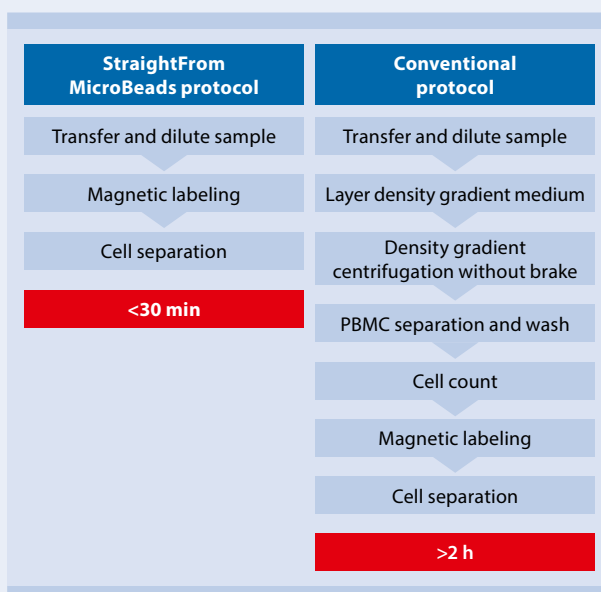
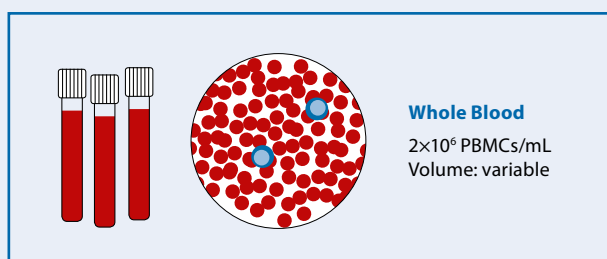


Figure 5: StraightFrom MicroBeads protocol shortens the isolation of target cells to less than 30 minutes.

StraightFrom® Whole Blood MicroBeads



Maximum flexibility for every sample volume

For numerous applications, leukocyte subsets need to be isolated from anticoagulated blood samples. Whole blood donations represent a readily available and versatile source material with well-defined cell numbers that come in any desired volume. StraightFrom® Whole Blood MicroBeads were designed to optimally fit this flexibility.

The MicroBeads are added directly to the whole blood sample without any prior cell counting or PBMC isolation. A variety of leukocyte subsets can thereby be isolated straightforward within minutes.

- No density centrifugation, erythrocyte lysis or cell counting needed
- Flexible sample volumes: 0.25–15 mL
- Manual to fully automated cell isolation

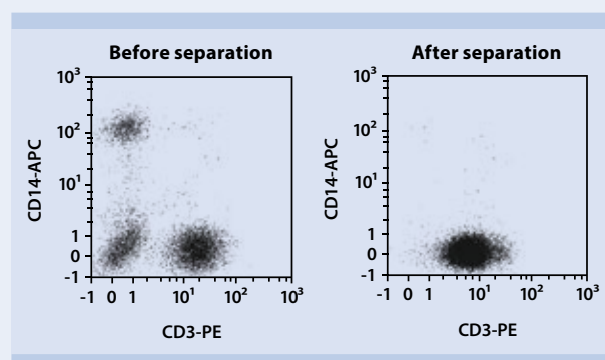
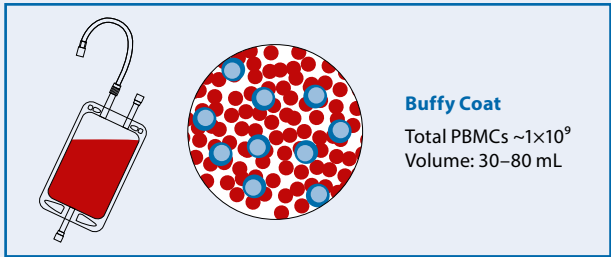


Figure 6: Separation of CD3⁺ cells from a whole blood sample using the StraightFrom® Whole Blood CD3 MicroBeads, human.

Product	Order no.
StraightFrom Whole Blood CD3 MicroBeads, human	130-090-874
StraightFrom Whole Blood CD4 MicroBeads, human	130-090-877
StraightFrom Whole Blood CD8 MicroBeads, human	130-090-878
StraightFrom Whole Blood CD14 MicroBeads, human	130-090-879
StraightFrom Whole Blood CD15 MicroBeads, human	130-091-058
StraightFrom Whole Blood CD19 MicroBeads, human	130-090-880
StraightFrom Whole Blood CD33 MicroBeads, human	130-094-773
StraightFrom Whole Blood CD45 MicroBeads, human	130-090-872
StraightFrom Whole Blood CD56 MicroBeads, human	130-090-875
StraightFrom Whole Blood CD66b MicroBeads, human	130-104-913
StraightFrom Whole Blood CD138 MicroBeads, human	130-093-062
StraightFrom Whole Blood Anti-ROR1 MicroBead Kit, human	130-105-751
StraightFrom Whole Blood CD326 (EpCAM) MicroBeads, human	130-109-827
Whole Blood Column Kit	130-093-545
autoMACS® Pro Separator Starting Kit	130-092-545
MultiMACS Cell24 Separator Plus	130-098-637
Whole Blood MidiMACS Starting Kit	130-098-240
Whole Blood QuadroMACS™ Starting Kit	130-098-242

Table 1: StraightFrom Whole Blood MicroBeads and accessories.

StraightFrom[®] Buffy Coat MicroBead Kits



Convenient processing in a single run

StraightFrom[®] Buffy Coat MicroBead Kits allow the fast and easy separation of leukocyte subsets directly from buffy coats. As by-products from whole blood donations (i.e., after processing them into erythrocyte concentrates or plasma products), buffy coats contain the same amount of leukocytes as the original whole blood donation, but in higher concentrations. These kits are perfectly suited to process an entire buffy coat to target cells in less than 30 minutes.

- No density gradient centrifugation, erythrocyte lysis, or washing steps needed
- Processing of an entire buffy coat in a single run in less than 30 min
- Ready-to-use kits including MicroBeads, Whole Blood Columns, and elution buffer
- Manual, semi-automated, or fully automated processing with the QuadroMACS[™] Separator, the MultiMACS[™] Cell24 Separator Plus, and the MultiMACS X

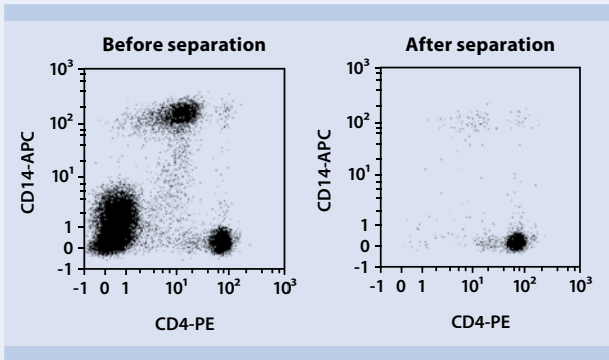
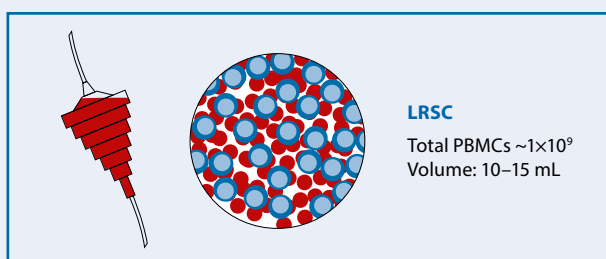


Figure 7: Separation of CD4⁺ cells from a buffy coat sample using the StraightFrom Buffy Coat CD4 MicroBead Kit and the MultiMACS Cell24 Separator Plus.

Product	Order no.
StraightFrom Buffy Coat CD3 MicroBead Kit, human	130-117-310
StraightFrom Buffy Coat CD4 MicroBead Kit, human	130-114-980
StraightFrom Buffy Coat CD8 MicroBead Kit, human	130-114-978
StraightFrom Buffy Coat CD4/CD8 MicroBead Kit, human	130-117-312
StraightFrom Buffy Coat CD14 MicroBead Kit, human	130-114-976
StraightFrom Buffy Coat CD19 MicroBead Kit, human	130-114-974
StraightFrom Buffy Coat CD56 MicroBead Kit, human	130-114-963

Table 2: StraightFrom Buffy Coat MicroBead Kits.

StraightFrom® LRSC MicroBead Kits



Streamlining cell separation from LRSC

LRSCs (Leukocyte Reduction System Chambers), also known as buffy cones, are used in routine plateletpheresis procedures for depletion of unwanted leukocytes. As LRSCs contain highly concentrated leukocytes in a relatively small volume, they are an ideal starting material.

StraightFrom® LRSC MicroBead Kits enable the separation of various leukocyte subsets directly from LRSCs via manual or automated cell separation.

- No density gradient centrifugation, erythrocyte lysis, or washing needed
- Processing of an entire LRSC in a single run
- Ready-to-use kits including MicroBeads, LS Columns, and elution buffer
- Manual, semi-automated, or fully automated processing with the QuadroMACS™ Separator, the MultiMACS™ Cell24 Separator Plus, and the MultiMACS X

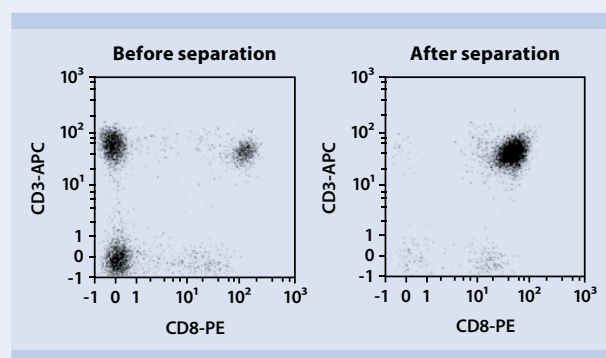
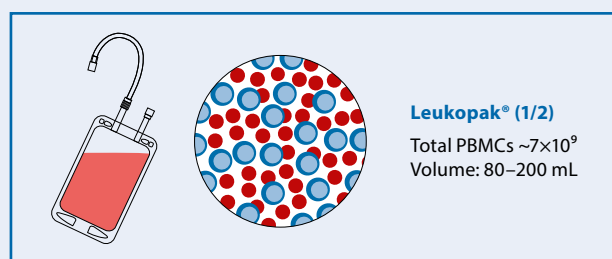


Figure 8: Separation of CD8⁺ cells from a LRSC sample using the StraightFrom LRSC CD8 MicroBead Kit and the MultiMACS Cell24 Separator Plus.

Product	Order no.
StraightFrom LRSC CD3 MicroBead Kit, human	130-117-309
StraightFrom LRSC CD4 MicroBead Kit, human	130-117-028
StraightFrom LRSC CD8 MicroBead Kit, human	130-117-027
StraightFrom LRSC CD4/CD8 MicroBead Kit, human	130-117-307
StraightFrom LRSC CD14 MicroBead Kit, human	130-117-026
StraightFrom LRSC CD19 MicroBead Kit, human	130-117-025
StraightFrom LRSC CD56 MicroBead Kit, human	130-117-024

Table 3: StraightFrom LRSC MicroBead Kits.

StraightFrom® Leukopak® MicroBead Kits



Fast isolation of large cell numbers

During leukapheresis, white blood cells are separated from the donor's blood and collected as highly concentrated leukocytes in a Leukopak®. Therefore, they are ideal for the isolation of large numbers of various leukocyte subsets via semi-automated magnetic cell separation using the StraightFrom® Leukopak® MicroBead Kits and the MultiMACS™ Cell Separator Family.

- No density gradient centrifugation, no erythrocyte lysis, or cell counting needed
- Processing of 1/2 Leukopak® in a single run
- Ready-to-use kits including MicroBeads, Multi-24 Column Block, and elution buffer
- Manual, semi-automated, or fully automated processing with the QuadroMACS™ Separator, the MultiMACS Cell24 Separator Plus, and the MultiMACS X

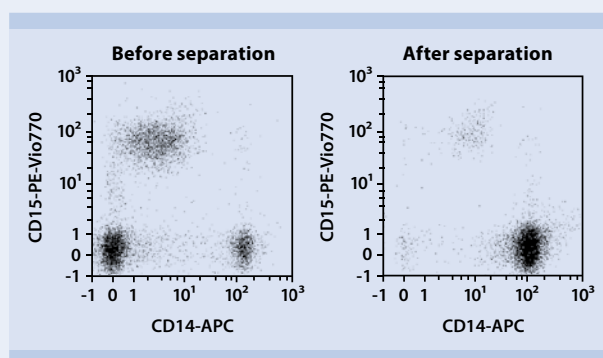


Figure 9: Separation of CD14⁺ cells from a Leukopak® sample using the StraightFrom® Leukopak® CD14 MicroBead Kit and the MultiMACS™ Cell24 Separator Plus.

Product	Order no.
StraightFrom® Leukopak® CD3 MicroBead Kit, human	130-122-365
StraightFrom® Leukopak® CD4 MicroBead Kit, human	130-117-022
StraightFrom® Leukopak® CD8 MicroBead Kit, human	130-117-019
StraightFrom® Leukopak® CD4/CD8 MicroBead Kit, human	130-122-352
StraightFrom® Leukopak® CD14 MicroBead Kit, human	130-117-020
StraightFrom® Leukopak® CD19 MicroBead Kit, human	130-117-021
24-well Deep Well Plates (4 pcs)	130-110-500
Single-well Deep Well Plates (2x2 pcs)	130-114-966

Table 4: StraightFrom® Leukopak® MicroBead Kits and consumables.

From manual to fully automated cell separation

Overview of MACS® Columns and Separators

With its MACS® Column and Separator portfolio, Miltenyi Biotec provides the perfectly tailored solution to fit the StraightFrom® MicroBead Technology. Explore the options below to learn more about our magnetic separation hardware.

- Manual MACS Cell Separation provides a simple and straightforward setup for excellent separation results
- Automated cell separation with the autoMACS® Pro Separator, the MultiMACS™ Cell24 Separator Plus, and the MultiMACS X allow for flexible workflow solutions with high throughput and maximal reproducibility





	Capacity per kit	Kit components	Separators
StraightFrom Whole Blood 	Up to 40 mL whole blood	StraightFrom Whole Blood MicroBeads	MidiMACS™ QuadroMACS™ autoMACS Pro MultiMACS Cell Separator Family
StraightFrom Buffy Coat 	1 buffy coat	StraightFrom Buffy Coat MicroBeads, Whole Blood Column Elution Buffer, Whole Blood Columns	QuadroMACS MultiMACS Cell Separator Family
StraightFrom LRSC 	1 LRSC	StraightFrom LRSC MicroBeads, Whole Blood Column Elution Buffer, LS Columns	QuadroMACS MultiMACS Cell Separator Family
StraightFrom® Leukopak® 	1/2 Leukopak®	StraightFrom® Leukopak® MicroBeads, Whole Blood Column Elution Buffer, Multi-24 Column Block	MultiMACS Cell Separator Family

Table 5: Overview of MACS Separators and Columns to be used with the StraightFrom MicroBeads.

autoMACS® Pro Separator

The full potential of StraightFrom Whole Blood MicroBeads is revealed in combination with the autoMACS® Pro Separator, a fully automated benchtop MACS Separator for the processing of up to six samples.

The instrument enables easy, fast, and user-independent magnetic labeling and isolation of cells in a fully automated fashion. With its unique features, it combines the high quality of MACS MicroBead Technology with sensor-controlled sample processing for maximum efficiency.

- Fully automated cell separation of up to six samples
- Standardized procedure for reproducible results
- Reliable separation of both frequent and rare cell types
- High purity, yield, and viability – as easy as it gets





MultiMACS™ Cell24 Separator Plus

The MultiMACS™ Cell24 Separator Plus enables semi-automated magnetic cell separation from large sample volumes or high sample numbers. Together with the StraightFrom® MicroBeads, it yields the best results for cell separations from every blood product. Combined with the Whole Blood Columns, LS Columns or the Multi-24 Column Block, it provides reliability for day-to-day cell separation.

- Fast and easy processing of up to 24 samples or a large sample volume in one single run
- Best for standardization and reproducible results
- Optimal procedure for all StraightFrom MicroBeads
- Small footprint and easy handling



MultiMACS™ X

The MultiMACS™ X is a fully automated cell separator that combines the MultiMACS Cell24 Separator Plus and a liquid handling system. Specifically developed for the demanding high-throughput cell processing lab, even large sample volumes and sample numbers can be processed quickly and conveniently with its fully customized workflow programs.

- Full automation from pipetting to cell separation and sample collection
- Processing of up to 24 samples or large sample volumes in a single run
- High-speed processing for maximum efficiency
- Workflows for tailored applications







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