Miltenyi Biotec

StraightFrom® Whole Blood CD56 MicroBeads
human

Order no. 130-090-875

Contents

1. Description
   - 1.1 Principle of the MACS® Separation
   - 1.2 Background information
   - 1.3 Applications
   - 1.4 Reagent and instrument requirements
2. Protocol
3. Example of a separation using StraightFrom Whole Blood CD56 MicroBeads, human
4. References

1. Description

This product is for research use only.

Components	**2 mL StraightFrom Whole Blood CD56 MicroBeads, human (# 130-090-875):** MicroBeads conjugated to monoclonal anti-human CD56 antibodies (isotype: mouse IgG1). **StraightFrom Whole Blood MicroBeads have been developed for use with the autoMACS® Pro Separator, autoMACS NEO Separator, MultiMACS™ Cell24 Separator Plus, QuadroMACS™ Separator, or QuadroMACS XL Separator.**
Capacity	For 40 mL human whole blood.
Product format	StraightFrom Whole Blood CD56 MicroBeads, human are supplied in buffer containing stabilizer and 0.05% sodium azide.
Storage	Store StraightFrom Whole Blood CD56 MicroBeads, human protected from light at +2 to +8 °C. Do not freeze. The expiration date is indicated on the vial label.

1.1 Principle of the MACS® Separation

First, the CD56$^+$ cells in a whole blood sample are magnetically labeled with StraightFrom Whole Blood CD56 MicroBeads, human. Then, the cell suspension is loaded onto a MACS Column, which is placed in the magnetic field of a MACS Separator. The magnetically labeled CD56$^+$ cells are retained within the column. The unlabeled cells run through; this cell fraction is thus depleted of CD56$^+$ cells. After removing the column from the magnetic field, the magnetically retained CD56$^+$ cells can be eluted as the positively selected cell fraction.

1.2 Background information

The StraightFrom Whole Blood CD56 MicroBeads, human has been developed for the positive selection of CD56$^+$ cells directly from anticoagulated whole blood by using the autoMACS Pro Separator, autoMACS NEO Separator, MultiMACS Cell24 Separator Plus, QuadroMACS Separator, or QuadroMACS XL Separator. No sample preparation is required, including density gradient centrifugation or erythrocyte lysis, as well as no washing step after labeling. The CD56 antigen is expressed by most NK cells and a T cell subset. Upon activation of NK cells, the surface expression of CD56 is increased.

1.3 Applications

- Isolation of CD56$^+$ cells from whole blood. The purified CD56$^+$ cells are well suited for further flow cytometric, functional, or molecular analysis including lineage-specific chimerism analysis after allogeneic stem cell transplantation[1-3].

1.4 Reagent and instrument requirements

- Separation buffer: Prepare a solution containing phosphate-buffered saline (PBS), pH 7.2, 0.5% bovine serum albumin (BSA), and 2 mM EDTA by diluting MACS BSA Stock Solution (# 130-091-376) 1:20 with autoMACS Rinsing Solution (# 130-091-222). Keep buffer cold (+2 to +8 °C). Alternatively, use autoMACS Running Buffer. Degas buffer before use, as air bubbles could block the column.

  ▲ **Note:** EDTA can be replaced by other supplements such as anticoagulant citrate dextrose formula-A (ACD-A) or citrate phosphate dextrose (CPD). BSA can be replaced by other proteins such as human serum albumin, human serum, or fetal bovine serum (FBS). Buffers or media containing Ca^{2+} or Mg^{2+} are not recommended for use.

- Table 1 provides an overview of MACS Columns and MACS Separators with links to the corresponding complete protocols. Use the link matching the MACS Column and MACS Separator used.

Table 1: MACS Columns and MACS Separators overview.

MACS Column (link to protocol)	Max. sample volume	MACS Separator
Columns for manual separation		
XL Whole Blood Column	100 mL (per column)	QuadroMACS XL
Whole Blood Column	0.25–15 mL (per column)	MidiMACS, QuadroMACS
Columns for instruments		
autoMACS Column	28 mL (per sample)	autoMACS NEO
autoMACS Column	28 mL (per sample)	autoMACS Pro Separation program: Positive selection: Posselwb/Rinse

Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68, 51429 Bergisch Gladbach, Germany
Phone +49 2204 8306-0, Fax +49 2204 85197
macsde@miltenyi.com
www.miltenyibiotec.com

140-000-688.09

MACS Column (link to protocol)	Max. sample volume	MACS Separator
Whole Blood Column	0.25–10 mL (per column)	MultiMACS Cell24 Separator Plus
Multi-24 Whole Blood Column Block	0.25–10 mL (per column)	MultiMACS Cell24 Separator Plus

- Automated separation:
  - autoMACS Pro Separator – Starter Kit (# 130-092-545) or autoMACS NEO Separator (# 130-120-327)
  - autoMACS Columns (# 130-021-101)
- Semi-automated separation:
  - MultiMACS Cell24 Separator Plus (# 130-098-637)
  - Whole Blood Column Kit (# 130-093-545), including Whole Blood Columns and Whole Blood Column Elution Buffer, and MultiMACS 12× Single-Column Adapter LS (# 130-108-816)

    or
  - Multi-24 Whole Blood Column Block (# 130-130-259) and and Whole Blood Column Elution Buffer (# 130-131-889)
- Manual separation:
  - QuadroMACS XL Separator (# 130-136-311) with XL Whole Blood Columns (# 130-139-767) and optional Whole Blood Column Elution Buffer (# 130-131-889)

    or

    MidiMACS Separator (# 130-042-302) or QuadroMACS Separator (# 130-090-976) with Whole Blood Column Kit (# 130-093-545), including Whole Blood Columns and Whole Blood Column Elution Buffer.
  - MidiMACS Separator (# 130-042-302), QuadroMACS Separator (# 130-090-976), or QuadroMACS XL Separator (# 130-136-311)
  - (Optional) MS Columns (# 130-042-201) or LS Columns (# 130-042-401) as second separation column.
- (Optional) Fluorochrome-conjugated antibodies for flow cytometric analysis, e.g., CD56-PE, CD16-APC, and CD45-VioBlue®. For more information about antibodies refer to www.miltenyibiotec.com/antibodies.
- (Optional) Propidium Iodide Solution (# 130-093-233) or 7-AAD Staining Solution (# 130-111-568) for flow cytometric exclusion of dead cells.
- (Optional) MACS SmartStrainers (30 µm) (# 130-098-458) to remove cell clumps.
- (Optional) Red Blood Cell Lysis Solution (10×) (# 130-094-183)
- (Optional) Dead Cell Removal Kit (# 130-090-101) for the depletion of dead cells.

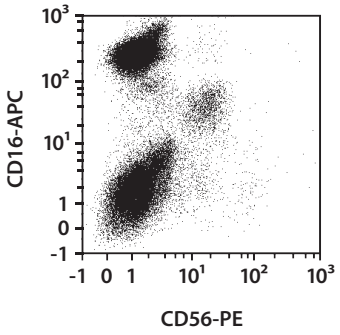
2. Protocol

▲ Complete labeling and separation protocols are available online. Use the link provided in table 1, based on the used MACS Column and MACS Separator.

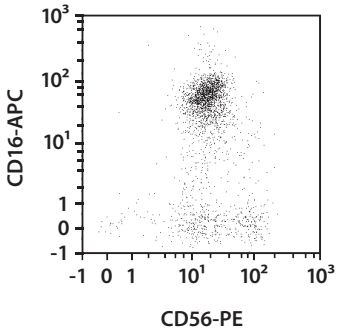
3. Example of a separation using StraightFrom Whole Blood CD56 MicroBeads

Separation of a whole blood sample using the StraightFromWhole Blood CD56 MicroBeads and the MultiMACS Cell24 Separator Plus with the Single-Column Adapter and Whole Blood Columns without washing step after labeling. Cells were fluorescently stained with CD56-PE, CD16-APC, as well as CD45-VioBlue® and analyzed by flow cytometry using the MACSQuant® Analyzer. Cells were triggered via CD45-VioBlue, cell debris and dead cells were excluded from the analysis based on scatter signals and propidium iodide fluorescence.

Before separation



After separation



4. References

1. Köhl, U. *et al.* (2003) Quantitative analysis of chimerism after allogeneic stem cell transplantation by PCR amplification of microsatellite markers and capillary electrophoresis with fluorescence detection: the Frankfurt experience. Leukemia 17: 232–236.
2. Adams, S. *et al.* (2004) Cell lineage-specific chimerism in post-hematopoietic stem celltransplant patients. MACS&more 8/2: 16–17.
3. Meyer, R. G. *et al.* (2007) Prophylactic transfer of CD8-depleted donor lymphocytes after T-cell–depleted reduced-intensity transplantation. Blood 109: 374–382.

Refer to **www.miltenyibiotec.com** for all data sheets and protocols. Miltenyi Biotec provides technical support worldwide. Visit www.miltenyibiotec.com for local Miltenyi Biotec Technical Support contact information.

Unless otherwise specifically indicated, all Miltenyi Biotec products and services are for research use only and not for diagnostic or therapeutic use.

140-000-688.09

Legal notices

Limited product warranty

Miltenyi Biotec B.V. & Co. KG and/or its affiliate(s) warrant this product to be free from material defects in workmanship and materials and to conform substantially with Miltenyi Biotec's published specifications for the product at the time of order, under normal use and conditions in accordance with its applicable documentation, for a period beginning on the date of delivery of the product by Miltenyi Biotec or its authorized distributor and ending on the expiration date of the product's applicable shelf life stated on the product label, packaging or documentation (as applicable) or, in the absence thereof, ONE (1) YEAR from date of delivery ("Product Warranty"). Miltenyi Biotec's Product Warranty is provided subject to the warranty terms as set forth in Miltenyi Biotec's General Terms and Conditions for the Sale of Products and Services available on Miltenyi Biotec's website at www.miltenyibiotec.com, as in effect at the time of order ("Product Warranty"). Additional terms may apply. BY USE OF THIS PRODUCT, THE CUSTOMER AGREES TO BE BOUND BY THESE TERMS.

THE CUSTOMER IS SOLELY RESPONSIBLE FOR DETERMINING IF A PRODUCT IS SUITABLE FOR CUSTOMER'S PARTICULAR PURPOSE AND APPLICATION METHODS.

Technical information

The technical information, data, protocols, and other statements provided by Miltenyi Biotec in this document are based on information, tests, or experience which Miltenyi Biotec believes to be reliable, but the accuracy or completeness of such information is not guaranteed. Such technical information and data are intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. Miltenyi Biotec shall not be liable for any technical or editorial errors or omissions contained herein.

All information and specifications are subject to change without prior notice. Please contact Miltenyi Biotec Technical Support or visit www.miltenyibiotec.com for the most up-to-date information on Miltenyi Biotec products.

Licenses

This product and/or its use may be covered by one or more pending or issued patents and/or may have certain limitations. Certain uses may be excluded by separate terms and conditions. Please contact your local Miltenyi Biotec representative or visit Miltenyi Biotec's website at www.miltenyibiotec.com for more information.

The purchase of this product conveys to the customer the non-transferable right to use the purchased amount of the product in research conducted by the customer (whether the customer is an academic or for-profit entity). This product may not be further sold. Additional terms and conditions (including the terms of a Limited Use Label License) may apply.

CUSTOMER'S USE OF THIS PRODUCT MAY REQUIRE ADDITIONAL LICENSES DEPENDING ON THE SPECIFIC APPLICATION. THE CUSTOMER IS SOLELY RESPONSIBLE FOR DETERMINING FOR ITSELF WHETHER IT HAS ALL APPROPRIATE LICENSES IN PLACE. Miltenyi Biotec provides no warranty that customer's use of this product does not and will not infringe intellectual property rights owned by a third party. BY USE OF THIS PRODUCT, THE CUSTOMER AGREES TO BE BOUND BY THESE TERMS.

Trademarks

autoMACS, MACS, MACSQuant, MidiMACS, the Miltenyi Biotec logo, MultiMACS, QuadroMACS, and StraightFrom are registered trademarks or trademarks of Miltenyi Biotec B.V. & Co. KG and/or its affiliates in various countries worldwide. All other trademarks mentioned in this publication are the property of their respective owners and are used for identification purposes only.

Copyright © 2026 Miltenyi Biotec and/or its affiliates. All rights reserved.

Unless otherwise specifically indicated, all Miltenyi Biotec products and services are for research use only and not for diagnostic or therapeutic use.

140-000-688.09