Miltenyi Biotec

MACSQuant® Analyzer 10

Your trusted partner in automated flow cytometry

Your trusted partner in automated flow cytometry

The MACSQuant Analyzer 10 brings to life the versatility and power required for modern flow cytometry applications. Whether mining for rare cells, analyzing the efficiency of your cell manufacturing process, or investigating signaling pathways, you are equipped for the task at hand.

Truly hands-free operation

With a range of automated features, the MACSQuant Analyzer 10 lays the foundation for true automation.

Flexibility

Easily and immediately switch between tubes and plates at the click of a button.

Simplicity

Minimize the learning curve with straightforward experiment setup and operation.

Multi-instrument alignment

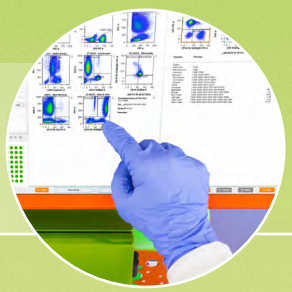
Using our Smart Gain software technology, users can harmonize data with collaborating labs to ensure reproducibility.

MACS
Quant 10

The features that make the difference

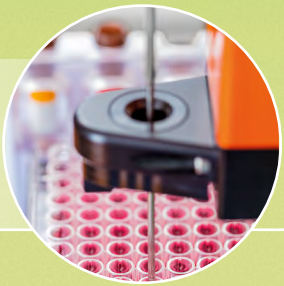
Large monitor

Integrated 15.6" monitor for simple touchscreen operation



Robotic needle arm

At the heart of automated sample mixing, processing, and autolabeling



Integrated MACS® Magnetic Cell Enrichment

Focus on your cells of interest and fortify your data

Precision volume uptake syringe

True volumetric cell counting without counting beads

Universal Reagent Rack

Flexible autolabeling options from glass or plastic vials

MACS MiniSampler Plus

Seamless sampling from single tubes, multiple tubes, or 96-well plates

MACS Quant 10
Rack
Chill 96 Rack
MACS® MiniSampler

Simplicity
Automation
Reliability
MACS Quant 10
MACS® MiniSampler

Automated analysis, reproducible results

Express Modes are unique add-on features for the MACSQuantify™ Software. They are standardized data analysis tools that are optimized to automate flow cytometric measurements and analysis via predefined experiment settings, acquisition, and automated gating. Derived from mathematical algorithms that are based on real-life experimental data, they reduce human error and therefore increase experimental reproducibility.

Express Modes contain application-dependent templates that are based on a significant amount of real data, including up to 1,000 test cases for a given application.

Custom Express Modes

Custom Express Modes can be developed specifically for your workflow and individual needs. They can cover automated acquisition and analysis with custom statistic tables and export of reports in various file formats.

For more information please contact:
Application_Development@miltenyibiotec.de

MACSPlex Cytokine Assays

MACSPlex Cytokine Assays are designed for determining concentrations of up to 12 soluble analytes in a single sample. The analysis is based on MACSPlex Capture Beads that have been coated with capture antibodies specific for cytokines. The bead populations can be distinguished by different fluorescence intensities.

In combination with the Express Modes of the MACSQuant Analyzer 10, the MACSPlex Cytokine Kits are optimized for automated measurement. They simplify flow cytometric analysis via predefined experiment settings, as well as acquisition and analysis templates (fig. 1).

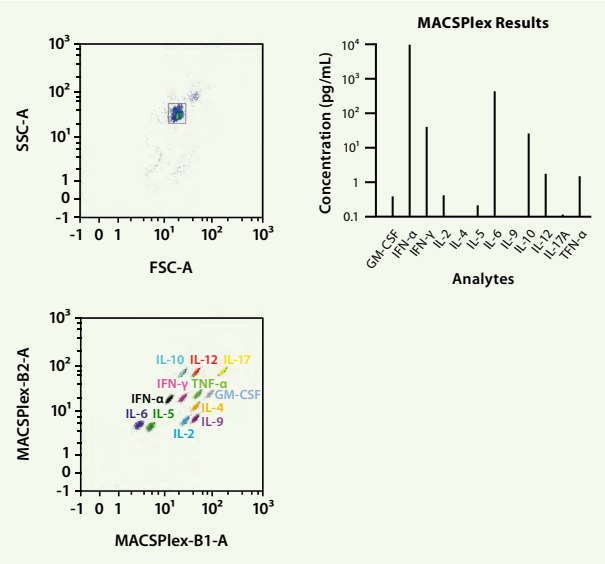


Figure 1: MACSPlex Express Mode – Standardized detection of the soluble human cytokines GM-CSF, IFN-α, IFN-γ, IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12, IL-17A, and TNF-α in a single sample.

MACSPlex Cytokine 12 Kit, human Sample A, Donor A	
GM-CSF	0.4 pg/mL
IFN-α	>10000.0 pg/mL
IFN-γ	40.9 pg/mL
IL-2	0.4 pg/mL
IL-4	<0.0 pg/mL
IL-5	0.2 pg/mL
IL-6	456.4 pg/mL
IL-9	<0.0 pg/mL
IL-10	26.5 pg/mL
IL-12	1.7 pg/mL
IL-17A	0.1 pg/mL
TFN-α	1.5 pg/mL

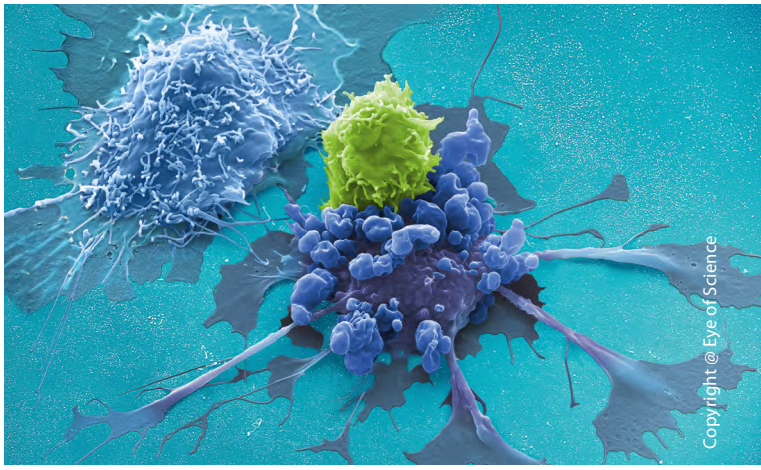
Your partner in cell therapy

Further characterize and enumerate your cells in your cell manufacturing applications. The MACSQuant Analyzer 10 hardware and software are configured to support small- to large-scale manufacturing requirements.

CAR T Cell Express Modes

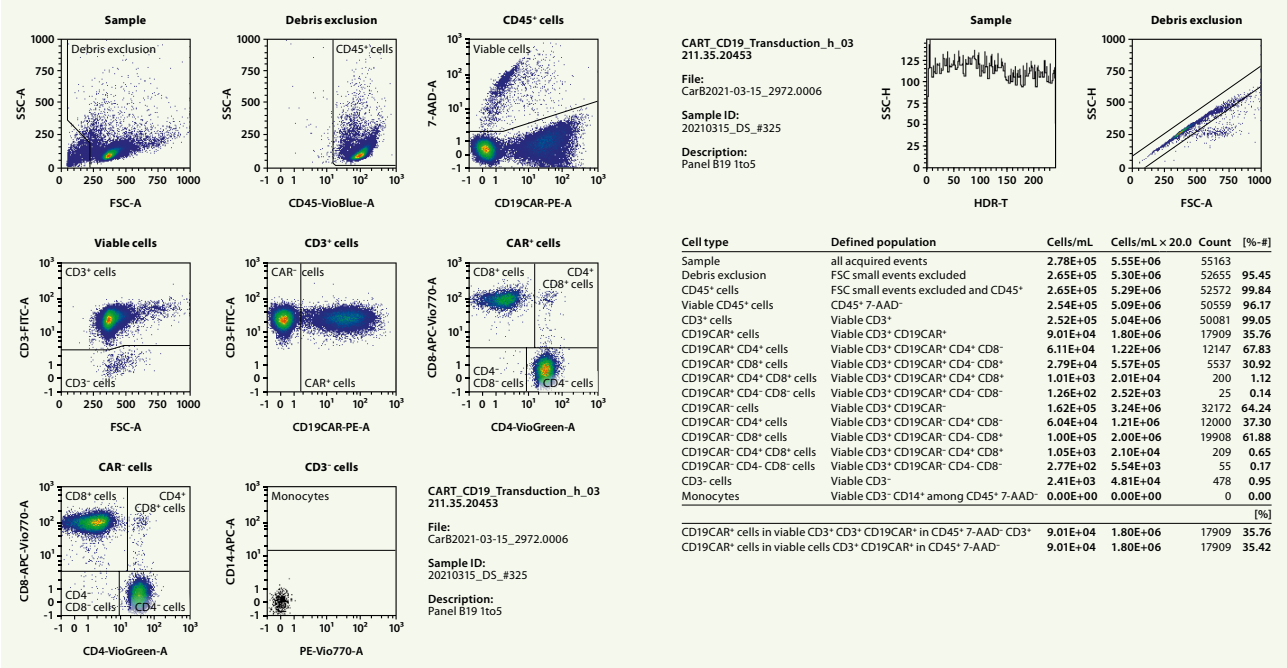
T cells control a variety of immune responses and therefore play a central role in the adaptive immune system. Recently, T cells have been redirected against cancer by genetic transduction with a receptor recognizing a specific tumor antigen. CD19 chimeric antigen receptor (CAR) T cells have shown tremendous clinical efficacy in the treatment of patients with hematological malignancies. As part of the CAR T cell production process, multicolor flow cytometry is a suitable and easy method to identify, characterize, and monitor CAR T cells.

For standardization and automation of CAR T cell analysis, Miltenyi Biotec has developed an Express Mode package that contains 12 optimized, application-specific Express Modes. It includes the CAR T Cell Transduction Express Mode (fig. 2), which can be used for the determination of transduction efficiency.



Express Mode Packages:

- **CD19 CAR T Cell**
- **Virus-specific T Cell Cytokine Capture System**
- **TCRαβ/CD45RA T Cell**
- **Master (contains all three)**



Cell type	Defined population	Cells/mL	Cells/mL × 20.0	Count	[%-#]
Sample	all acquired events	2.78E+05	5.55E+06	55163	
Debris exclusion	FSC small events excluded	2.65E+05	5.30E+06	52655	95.45
CD45⁺ cells	FSC small events excluded and CD45⁺	2.65E+05	5.29E+06	52572	99.84
Viable CD45⁺ cells	CD45⁺ 7-AAD⁻	2.54E+05	5.09E+06	50559	96.17
CD3⁺ cells	Viable CD3⁺	2.52E+05	5.04E+06	50081	99.05
CD19CAR⁺ cells	Viable CD3⁺ CD19CAR⁺	9.01E+04	1.80E+06	17909	35.76
CD19CAR⁺ CD4⁺ cells	Viable CD3⁺ CD19CAR⁺ CD4⁺ CD8⁻	6.11E+04	1.22E+06	12147	67.83
CD19CAR⁺ CD8⁺ cells	Viable CD3⁺ CD19CAR⁺ CD4⁻ CD8⁺	2.79E+04	5.57E+05	5537	30.92
CD19CAR⁺ CD4⁺ CD8⁺ cells	Viable CD3⁺ CD19CAR⁺ CD4⁺ CD8⁺	1.01E+03	2.01E+04	200	1.12
CD19CAR⁺ CD4⁻ CD8⁻ cells	Viable CD3⁺ CD19CAR⁺ CD4⁻ CD8⁻	1.26E+02	2.52E+03	25	0.14
CD19CAR⁻ cells	Viable CD3⁺ CD19CAR⁻	1.62E+05	3.24E+06	32172	64.24
CD19CAR⁻ CD4⁺ cells	Viable CD3⁺ CD19CAR⁻ CD4⁺ CD8⁻	6.04E+04	1.21E+06	12000	37.30
CD19CAR⁻ CD8⁺ cells	Viable CD3⁺ CD19CAR⁻ CD4- CD8⁺	1.00E+05	2.00E+06	19908	61.88
CD19CAR⁻ CD4⁺ CD8⁺ cells	Viable CD3⁺ CD19CAR⁻ CD4⁺ CD8⁺	1.05E+03	2.10E+04	209	0.65
CD19CAR⁻ CD4- CD8⁻ cells	Viable CD3⁺ CD19CAR⁻ CD4- CD8⁻	2.77E+02	5.54E+03	55	0.17
CD3- cells	Viable CD3⁻	2.41E+03	4.81E+04	478	0.95
Monocytes	Viable CD3⁻ CD14⁺ among CD45⁺ 7-AAD⁻	0.00E+00	0.00E+00	0	0.00
					[%]
CD19CAR⁺ cells in viable CD3⁺ CD3⁺ CD19CAR⁺ in CD45⁺ 7-AAD⁻ CD3⁺		9.01E+04	1.80E+06	17909	35.76
CD19CAR⁺ cells in viable cells CD3⁺ CD19CAR⁺ in CD45⁺ 7-AAD⁻		9.01E+04	1.80E+06	17909	35.42

Figure 2: CAR T Cell Transduction Express Mode. Standardized determination of transduction efficiency of CAR T cells.

Copyright © Artistdesign29/shutterstock.com

Harmonizing the world of flow cytometry is just an instrument setting away

Smart Gain with MACSQuantify™ Software

Experience consistently reproducible results from day to day, instrument to instrument, and operator to operator. With the Smart Gain technology of MACSQuantify Software, you can transfer your assay from one instrument to another, while passing on all necessary information to ensure an identical setup. As a result, the MACSQuant Operating System produces comparable, standardized results, every time, everywhere.

Consistency you can count on:

- **Reliable data from test to test**
- **From user to user**
- **From instrument to instrument**
- **Across sites**

Compliance with 21 CFR Part 11

You can be sure that your data is suitable for submission to regulatory agencies with the optional 21 CFR Part 11 feature, which includes:

- **Audit trail**
- **Analysis reports with e-signature**
- **User management system according to 21 CFR Part 11**

Focus on the cells you desire

Using the integrated MACS Enrichment Column, you can magnetically enrich your target population to perform a deeper analysis of rare cell subsets. Removing the non-relevant events before your flow analysis makes your assay even more robust.

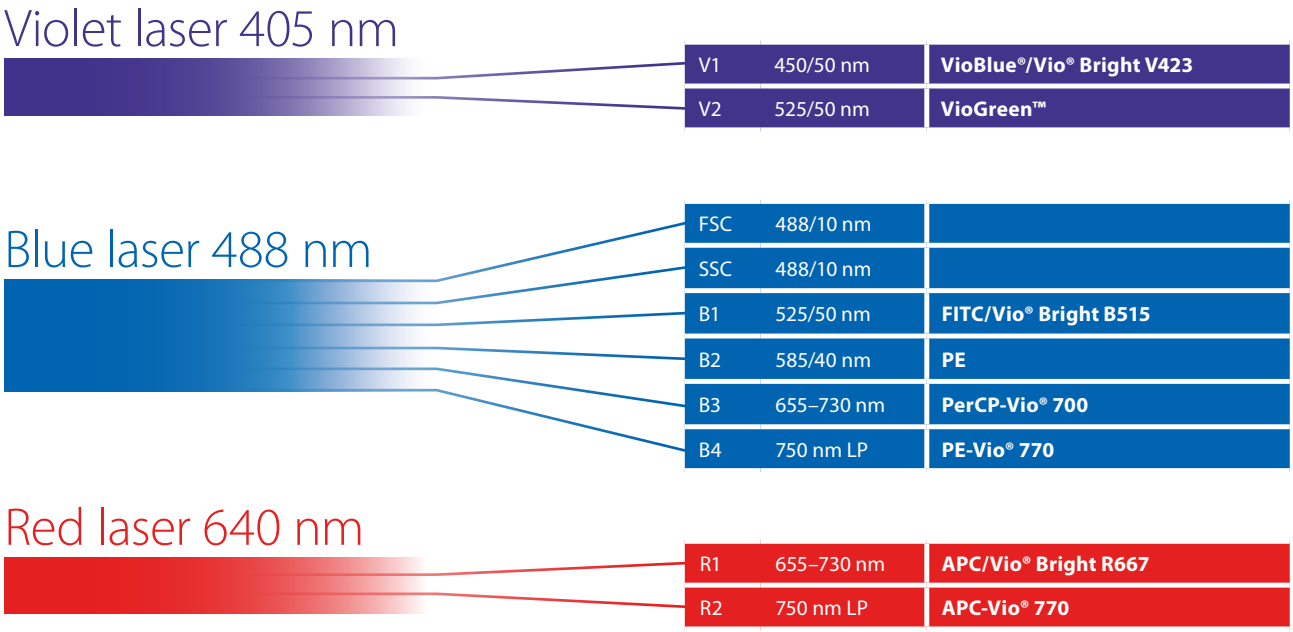
Autolabeling: the missing step in a fully automated flow cytometry assay

With the inclusion of the MACS MiniSampler Plus, the MACSQuant Analyzer 10 enables autolabeling of your samples using the automated pipetting arm. The newly designed Universal Reagent Rack allows you to add reagents to your tubes or plates from 5 mL glass or 1 mL plastic vials.

Why risk the variability when you can automate your applications?

Reduce the risk of pipetting error with the reliability of robotics. All you have to do is program the titer of your reagent, the time for incubation, and the dilution of your sample, if applicable. That's it! You are now ready for the instrument to label and prepare your samples automatically.

The MACSQuant Analyzer 10 optical bench



Complete your automation loop with reproducible reagents

Achieving maximum reproducibility between experiments cannot depend on the flow cytometer alone. In order to achieve consistent results, Miltenyi Biotec offers a complete flow cytometry solution, including a dedicated range of reagents. We help you make sure that variations in your experiment are due to your sample, and not due to unreliable antibodies or instruments.

REAfinity™ Recombinant Antibodies – flow cytometry is in their genes

Miltenyi Biotec has introduced a portfolio of REAfinity Recombinant Antibodies that provide superior lot-to-lot consistency and purity compared to mouse or rat monoclonal and polyclonal antibodies. Our recombinant technology also diminishes the need for FcR blocking and allows for analyses with single isotype control, generating high-quality data with no more background signal and saving effort when setting up experiments. For more information, visit: **miltenyibiotec.com/reafinity**

Advantages of REAfinity Recombinant Antibodies:

- **High lot-to-lot consistency**
- **One universal isotype**
- **No more background signal**

Vio® Dyes – brighter dyes for flow cytometry

When used in combination with our proprietary Vio and Vio Bright Dyes, you can take advantage of superior mean fluorescence intensity and high stain indices. With the brightest dyes on the market, setting up complex multicolor experiments has never been so simple. For more information, visit: **miltenyibiotec.com/vio**

Ready-to-use kits

Use Miltenyi Biotec's range of ready-to-use, pre-titrated kits and save valuable experiment set-up time and assay costs. Our kits have been validated for use with the automatic labeling capacities of the MACSQuant Analyzer 10, which in combination with our Express Modes gives you true walk-away capability. All you have to do is set up the experiment and return later to look at fully analyzed data.

Customized solutions

Miltenyi Biotec's custom antibody design service enables researchers to benefit from personalized flow cytometry solutions. This service includes purified, functional-grade antibodies, and single- and multicolor antibody conjugates, as well as multicolor antibody cocktails. To find out more, visit: **miltenyibiotec.com/customab**

MACSQuant Analyzer 10 specifications				
Optics				
Laser excitation	405 nm, 40 mW diode 488 nm, 30 mW DPSS (diode pumped solid state) 640 nm, 20 mW diode			
Emission detectors	FSC: 488/10 nm SSC: 488/10 nm	B1: 525/50 nm B2: 585/40 nm B3: 655–730 nm B4: 750 nm LP	V1: 450/50 nm V2: 525/50 nm	R1: 655–730 nm R2: 750 nm LP
Fluorescence sensitivity and resolution	MESFs (CV <5%): FITC <200 PE <100 APC <150			
Flow cell dimensions	200 × 250 µm			
Fluorescence detectors	Optimized with spectrally matched PMTs for all channels			
Optical alignment	Fixed tree-like configuration, no user adjustments needed			
Fluidics				
Minimal uptake volume*	1 µL (25 µL recommended for volumetric counting applications)			
Sample flow rate	25, 50, or 100 µL/minute or automate flow rate to maintain 500, 1,000, or 2,000 events/second			
Measurement speed [1,4]	<25 minutes per 96-well plate (5 µL measurement volume per well)			
Sample uptake	1–450µL			
Maximal event rate	15,000 events/second			
System maintenance	Automated startup, PMT calibration, cleaning cycles, and shutdown			
Sample mixing	Aspiration			
Performance				
Absolute counts performance[1,2]	Volumetric, reproducibility (CV) <5%			
Sample carryover[1,3]	0.01%			
Fluorescence performance	5-decade logarithmic scale (10^{-2} to 10^{3}), displayed in lin, log, or hlog scales			
Sample tube/plate	96-well plate (U, V, flat well, deep well), 5 mL, 2 mL, and 1.5 mL tubes			
MACS Cell Enrichment Unit	Rare cell enrichment prior to analysis			
Data management				
Operating system	Embedded operating system			
Measurement parameters	Area, width, height for all parameters, with time and volume			
Signal processing	>18-bit dynamic range in area with 32-bit floating point signal processing			
Compensation	Automated or manual with 8 × 8 matrix during or post-acquisition			
Threshold	Threshold can be set for any channel by selecting the trigger value			
Data files	.mqd (proprietary file type), .fcs (2.0, 3.0, 3.1 compatible)			
Technical specifications				
Size (w × d) (with MACS MiniSampler) Height (adjustable touchscreen)	669 mm × 500 mm (26.34" × 19.69") 394 mm–553.5 mm (15.51"–21.79")			
Weight	50 kg (110 lbs)			
Monitor	15.6" LCD touchscreen (internal)			
Power requirements	100–240 V~, 50/60 Hz			
Power consumption	450 W			
Ports	4× USB 2.0 ports, 6× USB 3.0 ports (2 at display), 2× DisplayPort, 2× LAN, DVI, RE-232, Audio			
Emission sound pressure level at workstation	<61 dB(A)			
Certification	CE-marked			

* At every uptake, an additional excess volume is aspirated by the instrument. The excess volumes are calibration- and process-dependent and do not exceed 10 µL for Fast, Standard, and Extended modes, and 20 µL for Screen mode.

[1] Referred value indicates the average of multiple experiments and can differ for individual sample materials.

[2] For counting performance, 96-well plates were loaded with 200 µL/well of fixed peripheral blood mononuclear cell (PBMC) suspension at a nominal concentration of 1,000 cells/µL. The uptake volume was set to 50 µL at low flow rate.

[3] For carry-over, full 96-well plates were loaded with 200 µL/well of PBMC suspension at a nominal concentration of 10,000 cells/µL in every other well ("SRC-wells"). Alternating wells are loaded with an equal volume of MACSQuant Running Buffer ("CO-wells"). The uptake volume was set to 100 µL and measured at medium flow rate in standard mode. The carry-over is defined by sum (CO-singlet count)/sum(SRC-singlet count) × 100%.

[4] The measurement speed is determined by measuring the time between the movement of the robotic arm into the first measured well and its movement out of the last measured well. The measurements were carried out at high flow rate in fast mode.

Support at your fingertips

MACSQuant® Live Support

- Live support at your fingertips via MACSQuant Support portal
- Have your questions answered in real time by one of our experts

▸ **miltenyi.com/support**

Application and instrument support

- Technical and field application support
- Custom automation and Express Mode development

▸ **miltenyi.com/custom-application-service**

Instrument training

- Training at regional Miltenyi Innovation and Training Centers (MITC)
- Onsite training and assay development
- Online application resources

▸ **miltenyi.com/training**

Service

- Comprehensive service options
- Globally distributed field service teams

▶ **miltenyibiotec.com/mq10**

Miltenyi Biotec

Germany/Austria
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

USA/Canada
Miltenyi Biotec, Inc.
2303 Lindbergh Street
Auburn, CA 95602, USA
Phone 800 FOR MACS
Phone +1 866 811 4466
Fax +1 877 591 1060
macsus@miltenyi.com

Australia
Miltenyi Biotec
Australia Pty. Ltd.
Unit 11, 2 Eden Park Drive
Macquarie Park, NSW 2113
Australia
Phone +61 2 8877 7400
Fax +61 2 9889 5044
macsau@miltenyi.com

Benelux
Miltenyi Biotec B.V.
Dellaertweg 9C
2316 WZ Leiden
The Netherlands
macsnl@miltenyi.com
Customer service for:
The Netherlands
Phone 0800 4020120
Fax 0800 4020100
Belgium
Phone 0800 94016
Fax 0800 99626
Luxembourg
Phone 800 24971
Fax 800 24984

China
Miltenyi Biotec Technology &
Trading (Shanghai) Co., Ltd.
Room A401, 4/F
No. 1077, Zhangheng Road
Pudong New Area
201203 Shanghai, P.R. China
Phone +86 21 6235 1005-0
Fax +86 21 6235 0953
macscn@miltenyi.com.cn

France
Miltenyi Biotec SAS
10 rue Mercoeur
75011 Paris, France
Phone +33 1 56 98 16 16
macsfr@miltenyi.com

Hong Kong
Miltenyi Biotec Hong Kong Ltd.
Unit 301, Lakeside 1
No. 8 Science Park West Avenue
Hong Kong Science Park
Pak Shek Kok, New Territories
Hong Kong
Phone +852 3751 6698
Fax +852 3619 5772
macshk@miltenyi.com.hk

Italy
Miltenyi Biotec S.r.l.
Via Paolo Nanni Costa, 30
40133 Bologna
Italy
Phone +39 051 6 460 411
Fax +39 051 6 460 499
macsit@miltenyi.com

Japan
Miltenyi Biotec K.K.
NEX-Eitai Building 5F
16-10 Fuyuki, Koto-ku
Tokyo 135-0041, Japan
Phone +81 3 5646 8910
Fax +81 3 5646 8911
macsjp@miltenyi.com

Nordics and Baltics
Miltenyi Biotec Norden AB
Medicon Village
Scheeletorget 1
223 81 Lund
Sweden
macsse@miltenyi.com
Customer service for:
Sweden
Phone 0200 111 800
Fax +46 280 72 99
Denmark
Phone 80 20 30 10
Fax +46 46 280 72 99
Norway, Finland, Iceland,
and Baltic countries
Phone +46 46 280 72 80
Fax +46 46 280 72 99

Singapore
Miltenyi Biotec Asia Pacific Pte Ltd.
438B Alexandra Road, Block B
Alexandra Technopark
#06-01
Singapore 119968
Phone +65 6238 8183
Fax +65 6238 0302
macssg@miltenyi.com

South Korea
Miltenyi Biotec Korea Co., Ltd.
Donggeuk 7F,
562 Nonhyeon-ro
Gangnam-gu
Seoul 06136, South Korea
Phone +82 2 555 1988
Fax +82 2 555 8890
macskr@miltenyi.com

Spain
Miltenyi Biotec S.L.
C/Luis Buñuel 2
Ciudad de la Imagen
28223 Pozuelo de Alarcón (Madrid)
Spain
Phone +34 91 512 12 90
Fax +34 91 512 12 91
macses@miltenyi.com

Switzerland
Miltenyi Biotec Swiss AG
Gibelinstrasse 27
4500 Solothurn
Switzerland
Phone +41 32 623 08 47
Fax +49 2204 85197
macsch@miltenyi.com

United Kingdom
Miltenyi Biotec Ltd.
Almac House, Church Lane
Bisley, Surrey GU24 9DR, UK
Phone +44 1483 799 800
Fax +44 1483 799 811
macsuk@miltenyi.com

www.miltenyibiotec.com

Miltenyi Biotec provides products and services worldwide. Visit **www.miltenyibiotec.com/local** to find your nearest Miltenyi Biotec contact.

Copyright owl image: @ Miles Away Photography/Shutterstock.com

Unless otherwise specifically indicated, Miltenyi Biotec products and services are for research use only and not for therapeutic or diagnostic use.
MACS, MACSQuant, MACSQuantify, REAfinity, Vio, VioBlue, VioGreen, and the Miltenyi Biotec logoare registered trademarks or trademarks of Miltenyi Biotec B.V. & Co. KG and/or its affiliates in various countries worldwide. Copyright © 2023 Miltenyi Biotec and/or its affiliates. All rights reserved.

130-132-397.02